

A BIOLOGICAL ASSESSMENT OF SITES IN THE NINEMILE CREEK DRAINAGE, MISSOULA COUNTY, MONTANA

TMDL-C04

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A report to

The Montana Department of Environmental Quality Planning, Prevention and Assistance Division Helena, Montana Andy Welch, Project Manager

by

Wease Bollman Rhithron Associates, Inc. Missoula, Montana February 2004





INTRODUCTION

Aquatic invertebrates are aptly applied to bioassessment since they are known to be important indicators of stream ecosystem health (Hynes 1970). Long lives, complex life cycles and limited mobility mean that there is ample time for the benthic community to respond to cumulative effects of environmental perturbations. This report summarizes data collected in July 2003 from 8 sites in the Ninemile Creek drainage. Sites were located in Missoula County, Montana and lie within the Northern Rockies ecoregion (Woods et al. 1999).

A multimetric approach to bioassessment such as the one applied in this study uses attributes of the assemblage in an integrated way to measure biotic health. A stream with good biotic health is "...a balanced, integrated, adaptive system having the full range of elements and processes that are expected in the region's natural environment..." (Karr and Chu 1999). The approach designed by Plafkin et al. (1989) and adapted for use in the State of Montana has been defined as " ... an array of measures or metrics that individually provide information on diverse biological attributes, and when integrated, provide an overall indication of biological condition." (Barbour et al. 1995). Community attributes that can contribute meaningfully to interpretation of benthic data include assemblage structure, sensitivity of community members to stress or pollution, and functional traits. Each metric component contributes an independent measure of the biotic integrity of a stream site; combining the components into a total score reduces variance and increases precision of the assessment (Fore et al. 1996). Effectiveness of the integrated metrics depends on the applicability of the underlying model, which rests on a foundation of three essential elements (Bollman 1998a). The first of these is an appropriate stratification or classification of stream sites, typically by ecoregion. Second, metrics must be selected based upon their ability to accurately express biological condition. Third, an adequate assessment of habitat conditions at each site to be studied enhances the interpretation of metric outcomes.

Implicit in the multimetric method and its associated habitat assessment is an assumption of correlative relationships between habitat measures and the biotic metrics, in the absence of water quality impairment. These relationships may vary regionally, requiring an examination of habitat assessment elements and biotic metrics and a test of the presumed relationship between them. Bollman (1998a) has studied the assemblages of the Montana Valley and Foothill Prairies (MVFP) ecoregion and has recommended a battery of metrics applicable to the montane ecoregions of western Montana. This metric battery has been shown to be sensitive to impairment, related to measures of habitat integrity, and consistent over replicated samples. However, scoring criteria developed for the MVFP ecoregion metric battery may not be appropriately sensitive for streams of the Northern Rockies ecoregion. Additional work may be needed to calibrate scoring to montane regions, thus impairment classifications must be interpreted with care.

METHODS

Samples were collected in July 2003 by personnel of the Montana Department of Environmental Quality (Montana DEQ). Sample designations and site locations are indicated in Table 1 and on Figure 1. The site selection and kicknet sampling method employed were those recommended in the Montana DEQ Standard Operating Procedures for Aquatic Macroinvertebrate Sampling (Bukantis 1998). Aquatic invertebrate samples were delivered to Rhithron Associates, Inc., Missoula, Montana, for laboratory and data analyses. In the laboratory, the Montana DEQ-recommended sorting method was used to obtain subsamples of at least 300 organisms from each sample, when possible. Organisms were identified to the lowest possible taxonomic levels consistent with Montana DEQ protocols.

 Table 1. Sample designations and locations. Sites are listed in upstream-todownstream order. Ninemile Creek drainage, July 2003.

Site ID	Station ID	Activity ID	Location Description	Collection Date	Latitude	Longitude
BBLUC 01	C04BBLUC01	03-C212-M	BIG BLUE CREEK 400 YDS U/S FROM MOUTH OF NINEMILE CREEK	07/25/03	47°-11'-34"	114°-35'-43"
JOSPC 01	C04JOSPC01	03-C214-M	JOSEPHINE CREEK U/S OF FS RD 890 100 YDS	07/26/03	47°-11'-09"	114°-29'-42"
JOSPC 02	C04JOSPC02	03-C213-M	JOSEPHINE CREEK 100 YDS U/S OF MOUTH OF NINEMILE CREEK	07/26/03	47°-08'-53"	114°-31'-59"
MCOR CO2	C04MCORC02	03-C211-M	MCCORMICK CREEK 250 YDS U/S OF CONFLUENCE OF LITTLE MCCORMICK CREEK	07/24/03	47°-09'-09"	114°-29'-12"
MCOR C01	C04MCORC01	03-C209-M	MCCORMICK CREEK 0.25 MI ABOVE MOUTH	07/24/03	47°-08'-08"	114°-30'-46"
CEDRC 01	C04CEDRC01	03-C215-M	CEDAR CREEK 0.5-0,75 M1 UP STARK MTN TRAIL #58 ABOVE FS 5515	07/29/03	47°-05'-22"	114°-30'-57"
STNYC 01	C04STNYC01	03-C208-M	STONY CREEK 250 YDS ABOVE FR 5490 XING	07/24/03	47°-06'-39"	114°-23'-43"
STNYC 02	C04STNYC02	03-C207-M	STONY CREEK 0.25 MI U/S FROM MOUTH OF NINEMILE CREEK	07/23/03	47°-04'-22"	114°-25'-41"

To assess aquatic invertebrate communities, a multimetric index developed in previous work for streams of western Montana ecoregions (Bollman 1998a) was used. Multimetric indices result in a single numeric score, which integrates the values of several individual indicators of biologic health. Each metric used in this index was tested for its response or sensitivity to varying degrees of human influence. Correlations have been demonstrated between the metrics and various symptoms of human-caused impairment as expressed in water quality parameters or instream, streambank, and stream reach morphologic features. Metrics were screened to minimize variability over natural environmental gradients, such as site elevation or sampling season, which might confound interpretation of results (Bollman 1998a). The multimetric index used in this report incorporates multiple attributes of the sampled assemblage into an integrated score that accurately describes the benthic community of each site in terms of its biologic integrity. In addition to the metrics comprising the index, other metrics shown to be applicable to biomonitoring in other regions (Kleindl 1995, Patterson 1996, Rossano 1995) were used for descriptive interpretation of results. These metrics include the number of "clinger" taxa, long-lived taxa richness, the percent of predatory organisms, and others. They are not included in the integrated bioassessment score. however, since their performance in western Montana ecoregions is unknown. However, the relationship of these metrics to habitat conditions is intuitive and reasonable.

The six metrics comprising the bioassessment index used for MVFP sites in this study were selected because, both individually and as an integrated metric battery, they are robust at distinguishing impaired sites from relatively unimpaired sites (Bollman 1998a). In addition, they are relevant to the kinds of impacts that are present in the Ninemile Creek drainage. They have been demonstrated to be more variable with anthropogenic disturbance than with natural environmental gradients (Bollman 1998a). Each of the six metrics developed and tested for western Montana ecoregions is described below. 1. Ephemeroptera (mayfly) taxa richness. The number of mayfly taxa declines as water quality diminishes. Impairments to water quality which have been demonstrated to adversely affect the ability of mayflies to flourish include elevated water temperatures, heavy metal contamination, increased turbidity, low or high pH, elevated specific conductance and toxic chemicals. Few mayfly species are able to tolerate certain disturbances to instream habitat, such as excessive sediment deposition.

2. Plecoptera (stonefly) taxa richness. Stoneflies are particularly susceptible to impairments that affect a stream on a reach-level scale, such as loss of riparian canopy, streambank instability, channelization, and alteration of morphological features such as pool frequency and function, riffle development and sinuosity. Just as all benthic organisms, they are also susceptible to smaller scale habitat loss, such as by sediment deposition, loss of interstitial spaces between substrate particles, or unstable substrate.

3. Trichoptera (caddisfly) taxa richness. Caddisfly taxa richness has been shown to decline when sediment deposition affects habitat. In addition, the presence of certain case-building caddisflies can indicate good retention of woody debris and lack of scouring flow conditions.

4. Number of sensitive taxa. Sensitive taxa are generally the first to disappear as anthropogenic disturbances increase. The list of sensitive taxa used here includes organisms sensitive to a wide range of disturbances, including warmer water temperatures, organic or nutrient pollution, toxic pollution, sediment deposition, substrate instability and others. Unimpaired streams of western Montana typically support at least four sensitive taxa (Bollman 1998a).

5. Percent filter feeders. Filter-feeding organisms are a diverse group; they capture small particles of organic matter, or organically enriched sediment material, from the water column by means of a variety of adaptations, such as silken nets or hairy appendages. In forested montane streams, filterers are expected to occur in insignificant numbers. Their abundance increases when canopy cover is lost and when water temperatures increase and the accompanying growth of filamentous algae occurs. Some filtering organisms, specifically the Arctopsychid caddisflies (*Arctopsyche* spp. and *Parapsyche* spp.) build silken nets with large mesh sizes that capture small organisms such as chironomids and early-instar mayflies. Here they are considered predators, and, in this study, their abundance does not contribute to the percent filter feeders metric.

6. Percent tolerant taxa. Tolerant taxa are ubiquitous in stream sites, but when disturbance increases, their abundance increases proportionately. The list of taxa used here includes organisms tolerant of a wide range of disturbances, including warmer water temperatures, organic or nutrient pollution, toxic pollution, sediment deposition, substrate instability and others.

Scoring criteria for each of the six metrics are presented in Table 2. Metrics differ in their possible value ranges as well as in the direction the values move as biological conditions change. For example, Ephemeroptera richness values may range from zero to ten taxa or higher. Larger values generally indicate favorable biotic conditions. On the other hand, the percent filterers metric may range from 0% to 100%; in this case, larger values are negative indicators of biotic health. To facilitate scoring, therefore, metric values were transformed into a single scale. The range of each metric has been divided into four parts and assigned a point score between zero and three. A score of three indicates a metric value similar to one characteristic of a non-impaired condition. A score of zero indicates strong deviation from non-impaired condition and suggests severe degradation of biotic health. Scores for each metric were summed to give an overall score, the total bioassessment score, for each site in each sampling event. These scores were expressed as the percent of the maximum possible score, which is 18 for this metric battery. The total bioassessment score for each site was



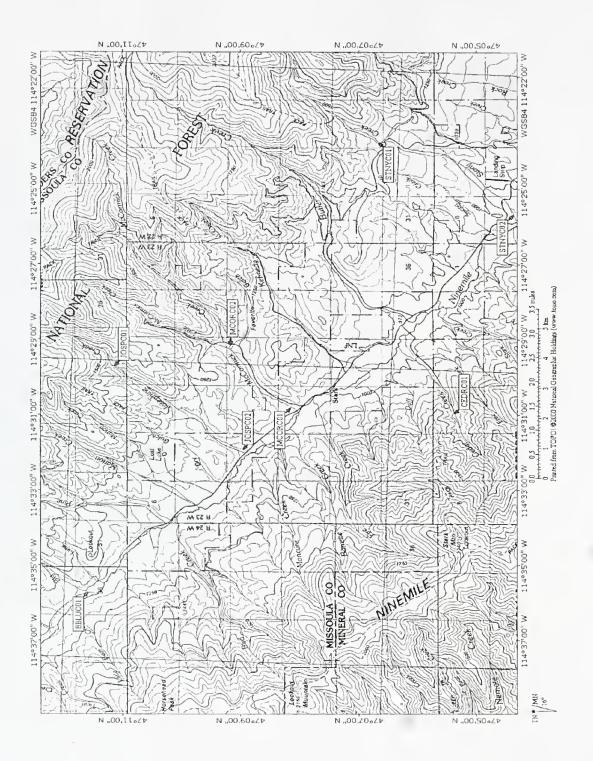


Figure 1. Approximate sampling locations. Ninemile Creek drainage. July 2003.

		Se	core	
Metric	3	2	1	0
Ephemeroptera taxa richness	> 5	5 - 4	3 - 2	< 2
Plecoptera taxa richness	> 3	3 - 2	1	0
Trichoptera taxa richness	> 4	4 - 3	2	< 2
Sensitive taxa richness	> 3	3 - 2	1	0
Percent filterers	0 - 5	5.01 - 10	10.01 – 25	> 25
Percent tolerant taxa	0 – 5	5.01 - 10	10.01 – 35	> 35

Table 2. Metrics and scoring criteria for bioassessment of montane streams of WesternMontana (Bollman 1998a).

Table3a. Criteria for the assignment of use-support classifications / standards violation thresholds (Bukantis 1998).

% Comparability to reference	Use support
>75	Full supportstandards not violated
25-75	Partial supportmoderate impairmentstandards violated
<25	Non-supportsevere impairmentstandards violated
Table3b. Criteria for the assignment	nent of impairment classifications (Plafkin et al. 1989).
% Comparability to reference	Classification
> 83 54-79 21-50 <17	nonimpaired slightly impaired moderately impaired severely impaired

expressed in terms of use-support. Criteria for use-support designations were developed by Montana DEQ and are presented in Table 3a. Scores were also translated into impairment classifications according to criteria outlined in Table 3b.

In this report, certain other metrics were used as descriptors of the benthic community response to habitat or water quality but were not incorporated into the bioassessment metric battery, either because they have not yet been tested for reliability in streams of western Montana, or because results of such testing did not show them to be robust at distinguishing impairment, or because they did not meet other requirements for inclusion in the metric battery. These metrics and their use in predicting the causes of impairment or in describing its effects on the biotic community are described below.

• The modified biotic index. This metric is an adaptation of the Hilsenhoff Biotic Index (HBI, Hilsenhoff 1987), which was originally designed to indicate organic enrichment of waters. Values of this metric are lowest in least impacted



conditions. Taxa tolerant to saprobic conditions are also generally tolerant of warm water, fine sediment and heavy filamentous algae growth (Bollman 1998b). Loss of canopy cover is often a contributor to higher biotic index values. The taxa values used in this report are modified to reflect habitat and water quality conditions in Montana (Bukantis 1998). Ordination studies of the benthic fauna of Montana's foothill prairie streams showed that there is a correlation between modified biotic index values and water temperature, substrate embeddedness, and fine sediment (Bollman 1998a). In a study of reference streams, the average value of the modified biotic index in leastimpaired streams of western Montana was 2.5 (Wisseman 1992).

- Taxa richness. This metric is a simple count of the number of unique taxa present in a sample. Average taxa richness in samples from reference streams in western Montana was 28 (Wisseman 1992). Taxa richness is an expression of biodiversity, and generally decreases with degraded habitat or diminished water quality. However, taxa richness may show a paradoxical increase when mild nutrient enrichment occurs in previously oligotrophic waters, so this metric must be interpreted with caution.
- Percent predators. Aquatic invertebrate predators depend on a reliable source of invertebrate prey, and their abundance provides a measure of the trophic complexity supported by a site. Less disturbed sites have more plentiful habitat niches to support diverse prey species, which in turn support abundant predator species.
- Number of "clinger" taxa. So-called "clinger" taxa have physical adaptations that allow them to cling to smooth substrates in rapidly flowing water. Aquatic invertebrate "clingers" are sensitive to fine sediments that fill interstices between substrate particles and eliminate habitat complexity. Animals that occupy the hyporheic zones are included in this group of taxa. Expected "clinger" taxa richness in unimpaired streams of western Montana is at least 14 (Bollman 1998b).
- Number of long-lived taxa. Long-lived or semivoltine taxa require more than a year to completely develop, and their numbers decline when habitat and/or water quality conditions are unstable. They may completely disappear if channels are dewatered or if there are periodic water temperature elevations or other interruptions to their life cycles. Western Montana streams with stable habitat conditions are expected to support six or more long-lived taxa (Bollman 1998b).

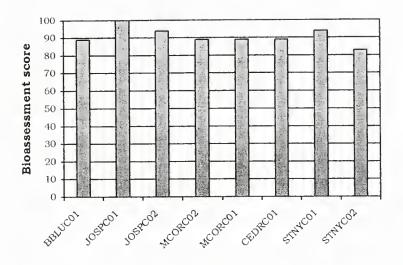
RESULTS

Bioassessment

Figure 2 summarizes bioassessment scores for aquatic invertebrate communities sampled from the Ninemile Creek drainage. Table 4 itemizes each contributing metric and shows individual metric scores for each site. Tables 3a and 3b above show criteria for impairment classifications (Plafkin et al. 1989) and use-support categories recommended by Montana DEQ (Bukantis 1998).

When this assessment method is applied to these data, scores indicate that all 8 studied sites were non-impaired and fully supported designated uses.

Figure 2. Comparison of total bioassessment scores (reported as percent of maximum score) for 8 sites in the Ninemile Creek drainage. July 2003. The revised bioassessment method (Bollman 1998a) was used to calculate scores.



Aquatic invertebrate communities

Interpretations of biotic integrity in this report are made without reference to results of habitat assessments, or any other information about the sites or watersheds that may have accompanied the invertebrate samples. Interpretations are based entirely on: the taxonomic and functional composition of the sampled invertebrate assemblages; the sensitivities, tolerances, physiology, and habitus information for individual taxa gleaned from the writer's research; the published literature, and other expert sources; and on the performance of bioassessment metrics, described earlier in the report, which have been demonstrated to be useful tools for interpreting potential implications of benthic invertebrate assemblage composition.

Big Blue Creek

A single site on Big Blue Creek (BBLUC01) was sampled for invertebrates. High mayfly taxa richness (12) at the site and low biotic index score calculated for the invertebrate assemblage suggest that water quality was excellent here. Among the 12 cold-stenotherms collected at the site were the stoneflies *Yoraperla brevis* and *Megarcys* sp. Cold, clean water appeared to provide the matrix for benthic animals characteristic of a non-impaired montane stream.

High numbers of "clinger" taxa (28) and caddisfly taxa (9) strongly imply that fine sediments did not substantially limit stony habitats. At least 49 taxa were supported at the site; instream habitats were likely complex. Stonefly taxa richness (8), which may be associated with reach-scale habitat features such as streambank stability, natural channel morphology, and riparian zone integrity, indicated intact habitats. Long-lived taxa were amply represented making it seem unlikely that scouring sediment pulses or dewatering limited long life cycles here. The functional mix included all expected components. Shredders were abundant, suggesting good riparian sources of large organic debris and suitable hydrology and channel complexity for its retention. The low numbers of scrapers suggests ample riparian shading; still, heptageniid mayflies (*Cinygmula* sp., *Epeorus* spp., *Ironodes* sp., etc.) were abundant enough to imply that metals contamination was probably not significant here.

Josephine Creek

Each of the 2 sampled sites on Josephine Creek (JOSPC01 and JOSPC02) supported sensitive assemblages indicative of excellent water quality conditions. Mayfly taxa richness was high at both sites (12 at the upper site, 8 at the lower site), and biotic index values (1.25 for the upper site, 2.81 for the lower site) were within expectations for an unpolluted mountain stream. Cold-stenotherms were diverse and abundant at each site.

Neither site exhibited evidence of excessive fine sediment deposition. Both "clingers" and caddisflies were amply represented in the sampled reaches. The upper site supported 11 caddisfly taxa and 19 "clinger" taxa while the lower site yielded 12 taxa and 23 taxa respectively. Exceptionally diverse assemblages (49 taxa at the upper site, 51 at the lower site) were collected at both sites, and stonefly richness (9 at the upper site, 7 at the lower) remained high along the longitudinal extent of the creek. Instream as well as reach scale habitat conditions were likely excellent. Dewatering and other limitations to long life cycles were probably not influential in Josephine Creek; semivoltine taxa were collected at both sites. Benthic assemblages were functionally similar in both reaches; all expected components were included. Shredders were abundant, implying ample riparian inputs of organic material.

McCormick Creek

Water quality indicators gave results indicating unpolluted water at the upstream site on McCormick Creek (MCORC02). The biotic index value (2.74) was low, and mayfly taxa richness high (9). The site supported at least 13 cold-stenotherm taxa.

High richness in both the "clinger" (27) and caddisfly (9) groups suggested that fine sediment deposition did not impair biologic health at this site. High overall taxa richness (51) and the large number of predator taxa (16) collected here likely reflect complex and undisturbed instream habitats. Six stonefly taxa were represented in the sample; reach scale habitat features were probably largely intact. Catastrophic dewatering or scouring sediment pulses seem unlikely, since 7 semivoltine taxa were counted. All expected components were present in the functional mix.

The biotic index value (3.65) calculated for the benthic assemblage collected at the downstream site on McCormick Creek (MCORC01) was higher than expected for a montane stream. The abundance of the midge *Cricotopus (Nostococladius)* accounts for the unexpected value returned for this metric. Montana DEQ Standard Operating Procedure calls for the assignment of a tolerance value of 6 for this taxon, which is considered by other biologists to be a sensitive, cold-stenotherm. Deleting the animal from the calculation results in a biotic index value of 2.56; this seems more consistent with the quality of the assemblage as a whole, and with the high mayfly taxa richness (8). Water quality was probably excellent at this site. Seven cold stenotherm taxa, including the stonefly *Megarcys* sp. were collected here.

Instream and reach scale indicators performed well at this site. Both "clinger" taxa (26) and caddisfly taxa (9) were well-represented. Stony benthic substrates were probably not impaired by excessive fine sediments. Forty-four taxa were counted in the sample; of these, 13 were predators. These findings imply that instream habitats were abundant and diverse here. The integrity of reach scale habitat features may be reflected in the high stonefly taxa richness (5). Five long-lived taxa were collected, implying that surface flow persisted year-round in this reach. All expected functional components were present.

Cedar Creek

The single sampled site on Cedar Creek (CEDRC01) supported a diverse, sensitive benthic assemblage. Mayfly taxa richness (8), the biotic index value (2.42) and the high number of cold-stenotherm taxa (9) all strongly suggest that cold, clean water characterized the visited reach. Twenty "clinger" taxa and 8 caddisfly taxa were collected; fine sediment deposition probably did not limit access to hard substrates. Overall taxa richness (44) and predator richness (15) both suggest that a diversity of instream habitats were available. The rich stonefly fauna (8 taxa) may be related to undisturbed streambanks, natural channel morphology, and intact riparian zones. It seems unlikely that disastrous interruptions to long life cycles were recent, since at least 5 semivoltine taxa were present at the site. All expected functional components, in seemingly appropriate proportions, were collected.

Stony Creek

Two sites on Stony Creek were visited. At the upper site (STNYC01), the taxonomic composition and tolerance characteristics of the sampled assemblage suggest cold water of excellent quality. At least 11 cold-stenotherm taxa were resident in the reach, mayfly taxa richness (9) was high, and the biotic index value (1.90) was low. Among the sensitive taxa present here were the caddisfly *Cryptochia* sp. and the stonefly *Setvena bradleyi*.

Eighteen "clinger" taxa and 12 caddisfly taxa were collected, implying that fine sediment deposition was not a limitation to biotic health in this reach. Instream habitats were likely diverse and available, since 44 taxa were present in the sample; eleven of these were predators. Stonefly diversity (6 taxa) was high enough to suggest that reach scale habitat features such as channel morphology and riparian zones were in natural condition. Five semivoltine taxa were taken; surface flow likely persisted here year-round, and recent scouring sediment pulses seem unlikely. The functional composition seemed appropriately balanced among all expected feeding groups.

Good water quality apparently extended downstream to the lower site on Stony Creek (STNYCO2), where high mayfly richness (7) and a low biotic index value (2.80) characterized the sampled assemblage. Cold-stenotherm taxa (3), however, were not as well-represented at this site compared to the other sites visited for this study. This may reflect somewhat warmer water temperatures in this reach.

Caddisfly taxa (9) and "clinger" taxa (17) were amply represented, suggesting that stony substrates were uncontaminated by excessive fine sediment deposition. Taxa richness (39) was within expectations for a montane stream. Stonefly taxa richness, however, was somewhat lower than expected; this may reflect disturbance to reach scale habitat features. Three taxa comprised the semivoltine fauna; all of these were elmid beetles. Periodic dewatering cannot be ruled out in this reach. Collectors were dominant among the functional groups.

CONCLUSIONS

- Seven of the sites studied supported diverse, sensitive, and functional benthic assemblages characteristic of unimpaired montane streams. These were the site on Big Blue Creek (BBLUC01), both site on Josephine Creek (JOSPC01 and JOSPC02), both sites on McCormick Creek (MCORC02 and MCORC01), the site on Cedar Creek (CEDRC01) and the upper site on Stony Creek (STNYC01).
- Evidence for somewhat warmer water temperatures and possible disturbance to reach scale habitat features could be discerned from the benthic assemblage sampled from the lower site on Stony Creek (STNYCO2).

				SIT	SITES			
	BBLUC01	JOSPC01	JOSPC02	MCORC02	MCORC01	CEDRC01	STNYC01	STNYC02
METRICS								
				METRIC	METRIC VALUES			
Ephemeroptera richness	12	12	∞	6	ø	∞	6	2
Plecoptera richness	80	6	7	9	ъ	80	6	5
Trichoptera richness	6	11	12	6	6	6	12	6
Number of sensitive taxa	13	15	ω	13	2	10	13	e
% filterers	14.00	0.61	4.56	10.60	3.69	12.77	6.04	6.47
% tolerant taxa	0.67	0.00	7.60	4.97	18.12	2.74	1.01	4.85
				METRIC SCORES	SCORES			
Ephemeroptera richness	3	3	3	З	e	e	m	e
Plecoptera richness	Э	3	3	З	ε	e	e	5
Trichoptera richness	З	3	3	е	n	ო	e	e
Number of sensitive taxa	υ	ю	3	3	З	ო	e	5
% filterers	1	З	3	1	ε	1	2	0
% tolerant taxa	ε	σ	7	З	1	З	З	e
TOTAL SCORE (max.=18)	16	18	17	16	16	16	17	15
PERCENT OF MAX.	89	100	94	89	89	89	94	83
Impairment classification*	NON	NON	NON	NON	NON	NON	NON	NON
USE SUPPORT	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL

Table 4. Metric values, scores, and bioassessments for 8 sites In the Ninemile Creek drainage. July 2003. Site locations are given

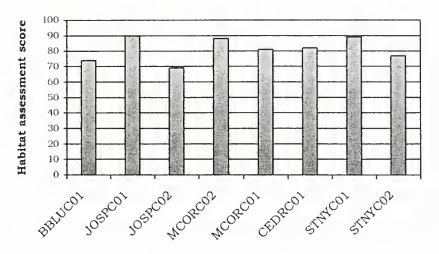
* Impairment classifications: (NON) non-impaired, (SLI) slightly impaired, (MOD) moderately impaired, (SEV) severely impaired. See Table 3b \uparrow Use support designations: See Table 3a.

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Habitat Assessment

Figure 3 graphically compares total habitat assessment scores recorded for the 8 sites in this study. Table 5 shows the habitat parameters evaluated, parameter scores and overall habitat evaluations for the sites studied.

Figure 3. Total habitat assessment scores for sites on the Ninemile Creek drainage. July 2003



Overall habitat conditions at the visited site on Big Blue Creek (BBLUC01) rated sub-optimal. Assessment forms delivered with the sample collected here indicate that the field investigator perceived severe sediment deposition at this site, although benthic substrate diversity was rated optimal. The riparian zone was noted to be abbreviated on the right side of the channel.

The upper site on Josephine Creek (JOSPC01) was judged to have optimal habitat conditions. All instream, streambank, and riparian zone parameters were noted to be in optimal or sub-optimal condition. Habitat at the lower site on Josephine Creek (JOSPC02) was perceived to be in sub-optimal overall condition. Moderate sediment deposition was noted, and flow status was rated marginal.

Both sites on McCormick Creek (MCCORC02 and MCCORC01) were rated optimal for overall habitat conditions. All instream and streambank parameters received optimal or sub-optimal scores; however, the riparian zone width was rated poor at the lower site.

Optimal conditions were perceived at the site on Cedar Creek (CEDRC01), in spite of moderate sediment deposition. All other parameters were scored optimally or sub-optimally.

The upper site on Stony Creek (STNYC01) received optimal scores for all streambank and riparian zone parameters, and for most instream habitat parameters. Channel flow status was judged sub-optimal. At the lower site (STNYC02), flow status rated a marginal score. The riparian zone was noted to be foreshortened on the right side of the channel. Overall habitat conditions rated sub-optimally. Table 5. Stream and riparian habitat assessment. Sites were assessed based upon criteria developed by Montana DEQ for streamswith riffle/run prevalence. The Ninemile Creek drainage. July 2003.

	STNYC 02	0	0	17	16	16	7	6/6	6/6	8/5	123	°∕₀LL	Sub- optimal
	STNYC 01	6	6	18	19	16	15	6/6	6/6	10/10	142	89%	Optimal
	CEDRC 01	0	9	16	20	9	17	6/6	10/10	10/10	132	82%	Optimal
SITES	MCORC 01	6	10	17	18	19	14	9/8	9/8	6/2	129	81%	Optimal
SIT	MCORC 02	6	6	18	17	18	17	7/7	6/6	10/10	140	88%	Optimal
	JOSPC 02	8	7	11	19	9	80	7/7	6/6	10/10	111	69 %	Sub- optimal
	JOSPC 01	10	6	19	20	16	15	9/8	6/6	10/10	144	%06	Optimal
	BBLUC 01	10	6	16	18	٦	18	9/8	10/9	6/5	119	74%	Sub- optimal
	Parameter	Riffle development	Benthic substrate	Embeddedness	Channel alteration	Sediment deposition	Channel flow status	Bank stability	Bank vegetation	Vegetated zone	Total	Percent of maximum	CONDITION*
	Max. possible score	10	10					20			160		

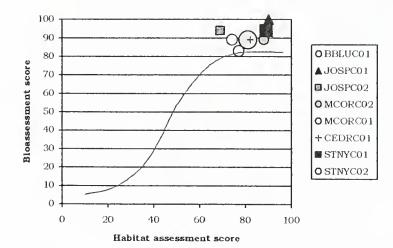
* Condition categories: Optimal > 80% of maximum score; Sub-optimal 75 - 56%; Marginal 49 - 29%; Poor <23%. Platkin et al. 1989.

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Habitat assessment vs. bioassessment

When habitat assessment scores are plotted against bioassessment scores, the resulting figure provides an opportunity to evaluate the hypothetical relationship between habitat integrity and water quality. Both factors are critical and interactive determinants of the composition and functional integrity of aquatic invertebrate assemblages. Presumably, high quality habitat, in the absence of impairments to water quality, supports functional, diverse, and sensitive invertebrate assemblages; these are assemblages that attain high bioassessment scores. Barbour and Stribling (1991) have hypothesized that diminishing habitat quality should produce predictable diminishment of bioassessment scores, when water quality is not a further insult. Figure 4 is a plot of habitat assessment scores against bioassessment scores (revised method) for the sampled assemblages of the Ninemile Creek drainage. The red line superimposed on the plot represents the hypothetical relationship between habitat quality and biotic integrity given good water quality. In this model, symbols falling in the upper right area of the graph would represent sites with high scores for both bioassessment and habitat assessment; according to this model, these would be unimpaired sites both in terms of habitat integrity as well as water quality. The plot in Figure 4 places all studied sites in the Ninemile Creek drainage in this region.

Figure 4. Total bioassessment scores plotted against habitat assessment scores for sites on the Ninemile Creek drainage. July 2003. (Barbour and Stribling 1991).



LITERATURE CITED

Barbour, M.T. and J.B. Stribling. 1991. Use of habitat assessment in evaluating the biological integrity of stream communities. In: *Biological Criteria: Research and Regulation*. Proceedings of a Symposium, 12-13 December 1990, Arlington, Virginia. EPA-440-5-91-005. U.S. Environmental Protection Agency, Washington, DC.

Barbour, M.T., J.B. Stribling and J.R. Karr. 1995. Multimetric approach for establishing biocriteria and measuring biological condition. Pages 63-79 in W.S. Davis and T.P. Simon (editors) *Biological Assessment and Criteria: Tools for Water Resource Planning and Decision Making*. Lewis Publishers, Boca Raton.

Bollman, W. 1998a. Improving Stream Bioassessment Methods for the Montana Valleys and Foothill Prairies Ecoregion. Master's Thesis (MS). University of Montana. Missoula, Montana.

Bollman, W. 1998b. Unpublished data generated by state-wide sampling and data analysis; 1993-1998.

Bukantis, R. 1998. Rapid bioassessment macroinvertebrate protocols: Sampling and sample analysis SOP's. Working draft. Montana Department of Environmental Quality, Planning Prevention and Assistance Division. Helena, Montana.

Fore, L.S., J.R. Karr and R.W. Wisseman. 1996. Assessing invertebrate responses to human activities: evaluating alternative approaches. *Journal of the North American Benthological Society* 15(2): 212-231.

Hilsenhoff, W.L. 1987. An improved biotic index of organic stream pollution. *Great Lakes Entomologist.* 20: 31-39.

Hynes, H.B.N. 1970. The Ecology of Running Waters. The University of Toronto Press. Toronto.

Karr, J.R. and E.W. Chu. 1999. Restoring Life in Running Waters: Better Biological Monitoring. Island Press, Washington, D.C.

Kleindl, W.J. 1995. A benthic index of biotic integrity for Puget Sound Lowland Streams, Washington, USA. Unpublished Master's Thesis. University of Washington, Seattle, Washington.

Patterson, A.J. 1996. The effect of recreation on biotic integrity of small streams in Grand Teton National Park. Master's Thesis. University of Washington, Seattle, Washington.

Plafkin, J.L., M.T. Barbour, K.D. Porter, S.K. Gross and R.M.Hughes. 1989. Rapid Bioassessment Protocols for Use in Streams and Rivers. Benthic Macroinvertebrates and Fish. EPA 440-4-89-001. Office of Water Regulations and Standards, U.S. Environmental Protection Agency, Washington, D.C.

Rossano, E.M. 1995. Development of an index of biological integrity for Japanese streams (IBI-J). Master's Thesis. University of Washington, Seattle, Washington.

Wisseman, R.W. 1992. Montana rapid bioassessment protocols. Benthic invertebrate studies, 1990. Montana Reference Streams study. Report to the Montana Department of Environmental Quality. Water Quality Bureau. Helena, Montana.

Woods, A.J., Omernik, J. M. Nesser, J.A., Shelden, J., and Azevedo, S. H. 1999. Ecoregions of Montana. (Color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia. US Geological Sur.

APPENDIX

The Ninemile Creek drainage

Taxonomic data and metric summaries

July 2003





Date Collecta	d 7/25/2003		Activi	ty ID	03-C2	12-N	1
Drder Coleoptera	Family	Tazon	Count	Percent	Unique	BI	F
oneoptern	Elmidae						
		Cleptelmis	1	0.33%	Yes	4	C
		Elmidae	3	1.00%	No	4	0
		Heterlimnius	22	7,33%	Yes	3	(
		Lara avara	3	1.00%	Yes	1	5
		Narpus	1	0.33%	Yes	2	
		Zaitzevia	1	0.33%	Yes	5	
lptera							
	Ceratopogonidae						
		Ceratopogoninae	2	0.67%	Yes	6	J
	Chironomidae						
		Brillia	42	14.00%	Yes	4	1
		Eukiefferiella Brehmi Gr.	4	1.33%	Yes	8	
		Micropsectra	12	4.00%	Yes	4	
		Parametriocnemus	1	0.33%	Yes	5	
		Rheocricotopus	1	0.33%	Yes	- 4	
		Rheotanytarsus	12	4.00%	Yes	6	
		Tvetenia	6	2.00%	Yes	5	
	Empididae						
		Chelifera	1	0.33%	Yes	5	
	D. 1	Empididae	1	0.33%	No	6	
	Ptychopteridae					_	
	0'	Ptychoptera	1	0.33%	Yes	7	
	Simuliidae						
	The set of the set	Simulium	1	0.33%	Yes	6	
	Tipulidae	D'	0	0.000			
		Dicranota Timu la	2	0.67%	Yes	3	
phameropter	2	Tipula	1	0.33%	Yes	4	
Paumeropter	Ameletidae						
	molocide	Ameletus	3	1.00%	Yes	0	,
	Baetidae		0	1.0070	100	0	
		Baetis tricaudatus	9	3.00%	Yes	4	
	Ephemerellidae					·	
		Caudatella	2	0.67%	Yes	0	
		Drunella doddsi	12	4.00%	Yes	1	
		Drunella spinifera	4	1.33%	Yes	0	
		Ephemerella	3	1.00%	Yes	1.5	
		Serratella	3	1.00%	Yes	2	,
	Heptageniidae					2	
		Cinygmula	5	1.67%	Yes	0	1
		Epeorus grandis	2	0.67%	Yes	0	
		Épeorus longimanus	2	0.67%	Yes	1	
		Ironodes	2	0.67%	Yes	0	
		Rhithrogena	7	2.33%	Yes	0	
apiotaxida							
	Enchytraeidae						
la contra-		Enchytraeidae	1	0.33%	Yes	4	,
lecoptera	Chlorens-Va						
	Chloroperlidae	K at land a star	_				
		Kathroperla Swaltan	1	0.33%	Yes	1	1
	Nemouridae	Sweltsa	4	1.33%	Yes	0	
	wemoundae	Malapha	-	1 (
		Malenka Visoka cataractae	5	1.67%	Yes	1	
					V	0	1
			4	1.33%	Yes	0	
	Peltoperlidae	Zapada columbiana	3	1.00%	Yes	2	

(Continued.....)



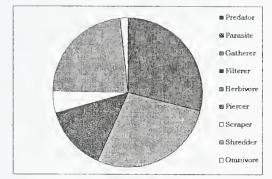
Site Name BIG BLUE CREEK 400 YRDS U/S FROM MOUTH 9MILE CR STORET STATIONC04BBLUC01 (...continued from previous page)

	Perlidae						
		Doroneuria	12	4.00%	Yes	0	PR
	Perlodidae						
		Megarcys	12	4.00%	Yes	1	PR
Trichoptera							
	Brachycentrídae						
		Micrasema	5	1.67%	Yes	1	SH
	Hydropsychidae						
		Arctopsyche grandis	3	1.00%	Yes	2	PR
		Arctopsychinae	12	4.00%	No	2	\mathbf{PR}
		Parapsyche elsis	5	1.33%	Yes	1	PR
	Lepidostomatidae						
		Lepidostoma (sand case)	2	0.67%	Yes	1	SH
	Limnephilidae						
		Ecclisomyia	4	1.33%	Yes	4	CG
	Philopotamidae						
		Dolophilodes	29	9.67%	Yes	0	CF
	Rhyacophilidae						
		Rhyacophila Betteni Gr.	7	2.33%	Yes	0	PR
		Rhyacophila Brunnea Gr.	8	2.67%	Yes	2	PR
		Rhyacophila narvae	2	0.67%	Yes	0	\mathbf{PR}
Tricladida							
	Planariidae						
		Polycelis coronata	5	1.67%	Yes	1	OM
Grand Total			300				

Project ID:		MTDEQ03C04		
STORET Station	ID:	C04BBLUC01		
Station Name:		BIG BLUE CREI	EK 400 YRDS U	15 PROM MOUTH 9MILE CI
Sample type			KICK	
SUBSAMPLE TO	TAL ORGA	NISMS	300	
Portion of sample	e used		40,00%	
Esumated numb	er in total	sample	750	
Sampling effort				
Time			DURATION 1	15 MINUTES / 20 FEET
Distance				
Jabs				
Hahitat type				
EPT abundance			176	
Taxa richness			49	
Number EPT teau	0		29	
Percent EPT			58.67%	
TAXONOMIC CC	MPOSITI	DN .		
GROUP	PERCENT	AXAT#		
Non-insect taxa	2.00%	2		
Odonata	0.00%	0		
Ephemeroptera	18.00%	12		
Plecoptera	15 00%	8		
Heteroptera	0.00%	0		
Megaloptera	0.00%	0		
Trichoptera	25 67%	11		
Lepidoptera	0.00%	0		
Coleoptera	10.33%	6		
Diptera	3.00%	7		
Chironomidae	25.00%	7		

• 1 Vietness	Contract of the				
0%	20%	40%	60%	80%	100%
01	ion-insect texa leteroptera Coleoptera	© Odonata © Megaloptera © Diotera	# Track	emeroptera loptera onomidae	□ Plecaptera O Lepidoptera

FUNCTIONAL	COMPOSITION		
GROUP	PERCENT	WEAXA	
Predator	29.00%	16	
Parasite	0 00%	0	
Gatherer	27.67%	19	
Pilterer	14 00%	3	
Herbivore	0.00%	0	
Piercer	0.00%	0	
Scraper	4 67%	S	
Shredder	23.00%	9	
Omnivore	1.67%	1	
Unknown	0 00%	0	



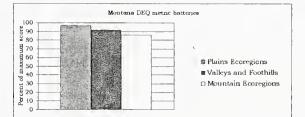
COMMUNITY TOLERABCES

Sediment tolerant taxa	2
Percent sechment tolerant	1.00%
Sediment sensitive texa	3
Percent sedunent semilitive	12.00%
Metala talerance index (McGuire)	2 02
Cold stenotherm taxa	12
Percent cold stenotherms	30.67%
HABITUS MEASURES	
Hemoglohm bearer richness	0
Percent hemoglohm bearers	0.00%
Air-breather richness	3
Percent sur-breathers	1.33%
Burrower richness	6
Percent burrowers	16 33%
Swimmer richnese	2
Percent swimmers	4.00%

Sample Date:	7/25/200	3		
DOMINANCE				
TAXON		ABUNDANCE	PERCENT	
Brillia		43	2 14.00%	
Dolophilodee		29		
Heterinamus		· 27		
Drunella doddes		13		
Doroneuria		12		
SUBTOTAL 5 DOMINANT	13	117		
Megarcys		12		
Arctopsychinae		12		
Micropaectra		12		
Rheatanytersus		12		
Baetis tricaudatus				
TOTAL DOMINANTS			\$8.00%	
SAPROBITY				
Hilsenhoff Biotic Index			2 21	
meenion prode nides			2 21	
DIVERSITY				
Shannon H (loge)			6.30	
Shennen H (log2)			4,37	
Margaleí D			9.11	
Singson D			0.05	
Evenness			0.05	
VOLTINISM			\$ 00	
TYPE		# TAXA	PERCENT	
Multivoltine		9	30 67%	
Univoltine		33	49 33%	
Semivoltine		7	20.00%	
TAXA CHARACTERS			20.0070	
	MTAXA		PERCENT	
Tolerant	2		0 67%	
Sensitive	13		31 00%	
Clinger	28		59 33%	
- and -			07 0074	
BIOASSESSMENT INDE	CES			
B-IBI (Karr et al.)				
METRIC	VALUE		SCORE	
Taxa richness	49		5	
E richness	12		S	
P richness	8		5	
T nchness	11		5	
Long-lived	7		5	
Senaitive richness	13		S	
%tolerant	0.67%		S	
%predatore	29 00%		Э	
Clinger richness	28		5	
%dommence [3]	31.00%		S	
		TOTAL SCORE	48	96%
MOSTANA DEQ METRIC	CS (Bukan			
MORDIO		Plans	Valleys and	Mountam
METRIC	VALUE	Ecoregions	Poothills	Ecoregions
Taxa richness	49	3	3	3
EPT richness	29	3	3	3
Biotic Index	2.21	3	3	3
%Dommant taxon	14.00%	3	3	3
%Collectors	41.67%	3	3	3
%EPT	58 67%	3	2	2
Shannon Diversity	4 37	3		
%Scropers +Shredders	27 67%	2	2	1
Piedator taxa	16	3		
%Moltrvoltine	30.67%	3		
0/11 / 78			3	
%H of T	25 97%			
TOTAL SCORES	23 91%	29	22	18
TOTAL SCORES PERCENT OF MAXIMUM		29 96,67		18 85.71
TOTAL SCORES			22	

Activity ID:

03-C212-M



Montans Plains ecoreginus metrics		
Rıffle	Pool	
EPT richness	29 E richness	12
Percent EPT	58 67% T richness	11
Percent Oligochaetes and Leeches	0.33% Percent EPT	58.67%
Percent 2 dominants	23 67% Percent non-insect	2.00%
Pilterer richness	3 Pilterer richness	3
Percent intolerant	57 33% Univoltine richness	33
Univolune richness	33 Percent supertolerant	1.33%
Percent chagers	59.33%	
Swimmer richness	2	



	rtebrate Taxonomic D OSEPHINE CREEK U/S	ata 5 OF FS RD 890 100 YDS	STOR	ET STATIC	N CO4J	OSPC	01
Date Collect	ed 7/26/2003		Activi	ty ID	03-C2	:14-M	
Order	Family	Тахор	Count	Percent	Vnique	BI	FFG
		NT		0.00%	N.	-	
		Nematoda Ostracoda	1 1	0.30% 0.30%	Yes Yes	5 8	PA CG
Acarlna	Acari						
	Atan	Acari	1	0.30%	Yes	5	PR
Coleoptera						-	
	Elmidae			0.000/			
Diptera		Heterlimnius	1	0.30%	Yes	3	CG
Diptera	Ceratopogonidae						
	1.9	Ceratopogoninae	1	0.30%	Yes	6	PR
	Chironomidae						
		<i>Brillia</i> Eukiefferiella Brehmi Gr.	24 1	7,32% 0.30%	Yes Yes	4	SH CG
		Eukiefferiella Devonica Gr.	3	0.30%	Yes	8	CG
		Micropsectra	11	3.35%	Yes	4	CG
		Pagastia	3	0.91%	Yes	1	CG
		Parametriocnemus	3	0.91%	Yes	5	CG
		Rheocricotopus	2	0.61%	Yes	4	CG
		Stempellinella	1	0.30%	Yes	4	CG
	Empididae	Symposiocladius	1	0.30%	Yes	5	SH
	15 mplatae	Oreogeton	1	0.30%	Yes	4	PR
	Simuliidae	creegeion	1	0.0070	100		1 1
		Prosimulium	2	0.61%	Yes	4	CF
Ephemeropte							
	Ameletidae	4	0	0 7 40/			-
	Baetidae	Ameletus	9	2.74%	Yes	0	ÇG
	1.40 Later	Baetis bicaudatus	8	2,44%	Yes	2	CG
		Baetis tricaudatus	1	0.30%	Yes	4	CG
	Ephemerellidae						
		Caudatella	1	0.30%	Yes	0	CG
		Drunella coloradensis	8	2.44%	Yes	0	PR
		Drunella doddsi Ephemerella	18 6	5.49% 1.83%	Yes Yes	$\frac{1}{1.5}$	PR SC
		Serratella tibialis	8	2.44%	Yes	1.5	CG
	Heptageniidae		-		100	2	00
		Cinygmula	26	7.93%	Yes	0	SC
		Epeorus deceptivus	27	8.23%	Yes	0	SC
		Epeorus grandis Rhithrogena	3	0.91%	Yes	0	SC
Plecoptera		Krannogena	11	3.35%	Yes	0	CG
•	Chloroperlidae						
		Suwallia	1	0.30%	Yes	1	PR
	1	Sweltsa	10	3.05%	Yes	0	\mathbf{PR}
	Leuctridae	Leuctridae	0	0 6 10/	17	0	011
	Nemouridae	LEUCHIGAE	2	0.61%	Yes	0	SH
		Visoka cataractae	10	3.05%	Yes	0	SH
		Zapada columbiana	25	7.62%	Yes	2	SH
	D-14	Zapada Oregonensis Gr.	4	1.22%	Yes	2	SH
	Peltoperlidae	Voranuda hao 'a	40	10 0000			
	Perlidae	Yoraperla brevis	42	12.80%	Yes	0	SH
		Doroneuria	7	2.13%	Yes	0	PR
	Perlodidae			212070	100	0	1.17
		Megarrys	7	2.13%	Yes	1	PR
					(Conti	nued.)





 Site Name
 JOSEPHINE CREEK U/S OF FS RD 890 100 YDS
 STORET STATION
 C04JOSPC01

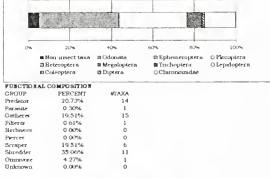
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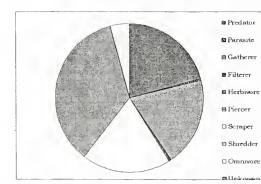
Trichoptera							
III caopter a	Brachycentridae						
		Micrasema	3	0.91%	Yes	1	SH
	Hydropsychidae						
		Parapsyche elsis	4	1.22%	Yes	1	PR
	Lepidostomatidae						
		Lepidostoma (sand case)	1	0.30%	Yes	1	SH
	Limnephilidae						
		Dicosmoecus gilvipes	1	0.30%	Yes	2	SC
		Homophylax	1	0.30%	Yes	2	SH
		Limnephilidae	2	0.61%	Yes	3	SH
	Rhyacophilidae						
		Rhyacophila	3	0.91%	Yes	1	PR
		Rhyacophila Betteni Gr.	2	0.61%	Ycs	0	\mathbf{PR}
		Rhyacophila Hyalinata Gr.	1	0.30%	Yes	0	PR
		Rhyacophila narvae	4	1.22%	Yes	0	\mathbf{PR}
	Uenoidae						
		Neothremma	1	0.30%	Yes	1	SC
Tricladida							
	Planariidae						
		Polycelis coronata	14	4.27%	Yes	1	OM
Grand Total			328				

12

Aquatic Invertel	brate Data B	stu au arry		
Project ID:	3	TDEQ03C04		
STORET Station		CO4JOSPC01		
Station Bame.	J	OSEPHINE CRI	EEK U/S OF FS 1	RD 890 100 YDS
Smanple type			KICK	7
SUBSAMPLE TO	TAL ORGANIS	MS	328	
Portson of sample	a used		56 67%	
Estimated numb	er in total seu	nple	579	
Sempling effort				
Tune			DURATION. 1	IS MINUTES / 20 FEET
Distance				
Jaba				
Habitat type				
EPT abundance			257	
Taxa nchness			49	
Number EFT too	a		32	
Percent EPT			78 35%	
TAMONONIC CO	MPOSITION			
GROUP	PERCENT	HTAXA		
Non-unsect taxa	5.18%	4		
Odonata	0.00%	0		
Ephemeroptera	38.41°6	12		
Plecontera	32 9 7%	9		

Plecoptera	32.93%	9
Heteroptera	0.00%	0
Megaloptera	0.00%	0
Trichoptera	7 01%	11
Lepidoptera	0.00%6	0
Coleopters	0.30%	1
Duptera	1.22%	3
Claronomidae	14.94%	9





COMMUNITY TOLERANCES	
Sedment tolerant texa	0
Percent sedment tolerant	0.00%
Sedunent sensitive trop	1
Percent sedment sensitive	1 22%
Metals tolerance index (McGuire)	1.46
Cold stenotherm texa	15
Percent cold stenotherma	47 87%
HABITUS MEASURES	
Hemoglobin bearer richness	0
Percent bearing johin bearers	0.00%
Air breather richness	0
Percent ar breathers	0.00%
Burrower richness	3
Pricent hurrowers	7.93%
Swimmer richness	3
Percent swissmen	5 49%

Activity ID:	03-C214-M			
Sample Date:	7/26/2003			
DOWINKACE				
TAXON		ABUNDANCE	PERCENT	
foraperla brevis		43		
Epeonus deceptivus		2		
Cmygnula Zapada columbiana		20		
Brillia		2.		
SUBTOTAL 5 DOMINANTS	5	14		
Drunella doddai		- 14		
Polycebs coronata		1		
Rhathmogenna		1		
Micropsectra		1		
Sweltsa FOTAL DOMINANTS		20		
IOIAL DOMINANTS		20	5 0.5.4 1 /s	
SAPROBITY Rilsenhoff Biotic Index			1.25	
DIVERSITY				
Shannon H (loge)			5 89	
Shannon H (log2)			4 08	
Margalef D			8.28	
Simpson O Evenness			0.05	
VOLTINISM			0.00	
TYPE		# TAXA	PERCENT	
Multivoltzie		15	22 87%	
Univoltine		30	73.17%	
Semivoltme		4	3.96%	
TAXA CHARACTERS	#TAXA		PERCENT	
Tolerant	#LA.A		0.00%	
Senative	15		47 87%	
Clauger	19		53.96%	
BIOASSESSMENT INDIC	ES			
B-IBI (Karr et al.) METRIC	VALUE		SCORE	
Taxa nchness	49		5	
E richnesa	12		5	
P richness	9		5	
T nchness	11		5	
Long-lived	4		3 5	
Senative richness %tolerant	15 0.00%		5	
%predators	20 73%		3	
Clinger richness	19		3	
%dommance [3]	28 96%		5	
		TOTAL SCORE	44	88%
MOSTANA DEQ METRIC	S (Bukantis	1998) Fleura	Valleys and	Mountain
METRIC	VALUE	Ecoregiona	Foothills	Ecoregions
Taxa nchmess	49	3	3	3
EPT richness	32	3	3	3
Bione Index	1 25	3	3	3
%Dominant taxon	12 80%	3	3	3
%Callectors	20.12%	3	3	3
%EPT	78 35% 4 08	3	3	3
Shannon Diversity %S-rapers +Shredders	4 08 54 57%	3	3	2
Predator taxa	54 57% 14	3	3	2
%Multivoltine	22 87%	3		
%H of T	17.39%		3	
TOTAL SCORES		30	24	20
PERCENT OF MAXIMUM		100 00 . NON .	100 00	95 24
IM PAIRMENT CLASS			NON	NON

	Plaurs Ecoregions Wylleys and Foothils OMountain Ecoregion
--	--

Montana Plaios ecoregious metrics (B	ramblett and Johnson)	
Røfle	Pool	
EPT richness	32 E nchinesa	1:
Percent EPT	78 35% T richness	1
Percent Oligochaetes and Leeches	0 00% Percent EPT	78.35%
Percent 3 dommants	21.04% Percent non-msect	5.18%
Filterer richness	1 Filterer richness	
Percent intolerant	82 62% Univoltine richness	34
Univoltine richness	30 Percent supertolerant	1 52%
Percent chargers	53.96%	
Swimmer richness	3	



Aquatic Invertebrate Taxonomic Data

Site Name JOSEPHINE CREEK 100 YRDS U/S OF MOUTH 9MILE CREEK		STOR	ET STATIO	N CO4JC	C04JOSPC02			
Date Collect	ed 7/26/2003		Activity ID		03-C2	03-C213-M		
Order	Family	Tazon	Count	Percent	Unlque	BI	FFG	
		Nematoda	1	0,30%	Yes	5	PA	
Coleoptera	Dytiscidae							
	Dyddenae	Oreodytes	3	0.91%	Yes	5	PR	
	Elmidae	er eeu grees	Ŭ	0.7170	103	0	1 10	
		Heterlimnius corpulentus	5	1.52%	Yes	3	CG	
		Lara avara	2	0.61%	Yes	1	SH	
		Narpus	1	0.30%	Yes	2	CG	
		Zaitzevia	20	6.08%	Yes	5	CG	
	Hydrophilidae							
		Hydrobius	1	0.30%	Yes	8	PR	
Diptera								
	Ceratopogonidae							
		Ceratopogoninae	2	0.61%	Yes	6	\mathbf{PR}	
	Chironomidae							
		Brillia	87	26.44%	Yes	4	SH	
		Corynoneura	1	0.30%	Yes	7	CG	
		Cricotopus (Cricotopus)	3	0.91%	Yes	7	SH	
		Cricotopus (Nostococladius)	2	0.61%	Yes	6	SH	
		Eukiefferiella Devonica Gr.	1	0.30%	Yes	8	CG ·	
		Micropsectra	2	0.61%	Yes	4	CG	
		Microtendipes	2	0.61%	Yes	6	CF	
		Pagastia	2	0.61%	Yes	1	CG	
		Rheotanytarsus Thionomonaiollo	3 3	0.91%	Yes	6	CF	
		Thienemanniella Thienemannimuia Gr	4	0.91% 1.22%	Yes Yes	6 5	CG PR	
		Thienemannimyia Gr. <i>Tvetenia</i>	11	3.34%	Yes	5	CG	
	Simuliidae	Treferitor	11	3.3470	162	5	CG	
	Shirdingas	Simulium	1	0.30%	Yes	6	CF	
	Tipulidae	Spininum	L	0.5074	105	0	CI.	
	ipului	Dicranota	2	0.61%	Yes	3	PR	
Ephemeropte	era		4	0.0170	100	v	110	
A	Ameletidae							
		Ameletus	4	1.22%	Yes	0	CG	
	Baetidae							
		Baetis tricaudatus	2	0.61%	Yes	4	CG	
		Diphetor hageni	2	0.61%	Yes	5	CG	
	Ephemerellidae							
		Drunella spinifera	2	0.61%	Yes	0	PR	
		Serratella tibialis	16	4.86%	Yes	2	CG	
	Heptageniidae							
		Ironodes	29	8.81%	Yes	0	SC	
		Rhithrogena	10	3.04%	Yes	0	CG	
	Leptophlebiidae							
		Paraleptophlebia	3	0.91%	Yes	1	CG	
Haplotaxida	Realister 11							
	Enchytraeidac	E o huter oid o o		0.2004	17		00	
Bleenster		Enchytraeidae	1	0.30%	Yes	4	CG	

Plecoptera

Chloroperlidae

Leuctridae

Nemouridae

Sweltsa

Leuctridae

Malenka

Zapada cinctipes Zapada columbiana

2.43% Yes 3 SH 2 SH 1.52% Yes 0.61% Yes

Yes

Yes

0 - PR

0 SH

SH 1

3

1

8

5 2

0.91%

0.30%

(Continued.....)

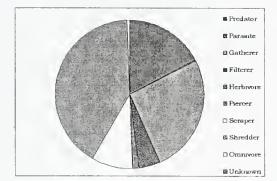
Site Name JOSEPHINE CREEK 100 YRDS U/S OF MOUTH 9MILE CREEK STORET STATION C04JOSPC02 (...continued from previous page)

	Perlidae						
		Doroneuria	6	1.82%	Yes	0	PR
		Perlidae	4	1.22%	No	'2	PR
	Perlodidae						
		Megarcys	1	0.30%	Yes	1	PR
Trichoptera							
	Brachycentridae						
		Micrasema	7	2.13%	Yes	1	SH
	Hydropsychidae						
		Arctopsyche grandis	22	6.69%	Yes	2	PR
		Hydropsyche	5	1.52%	Yes	5	CF
	Hydroptilidae						
	I an ida sha wa sida a	Ochrotrichia	5	1.52%	Yes	4	PH
	Lepidostomatidae	The True of the State					
		Lepidostoma (panel case)	2	0.61%	Yes	1	SH
		Lepidostoma (turret case)	13	0.61%	Yes	1	SH
	* · · · · · · · · · · · · · · · · · · ·						
	Limnephilidae						
		Ecclisomyia	1	0.30%	Yes	4	CG
	Dh Barrata av 14	Onocosmoecus	3	0.91%	Yes	3	SH
	Philopotamidae						
		Dolophilodes	1	0.30%	Yes	0	CF
	Rhyacophilidae	Wormaldia	3	0.91%	Yes	0	CF
	Rhyacopinidae	Diverse in the	-				
		Rhyacophila Bhuacaphila Davasa Os	5	1.52%	No	1	PR
		Rhyacophila Brunnea Gr.	1	0.30%	Yes	2	PR
Tricladida		Rhyacophila narvae	1	0.30%	Yes	0	PR
	Planariidae						
	A MAINTAINTAU	Połycelis coronata	0	0 6 10/	17		0.14
Grand Total		1 orgeens coronata	2 329	0.61%	Yes	1	OM
			329				



STORET Station Station Name: Sample type SUBSAMPLE TO Portion of sample Estimated numi Sampling effort	TAL ORGANI:		KICK	MOUTB 9MILE CREEK
Sample type SUBSAMFLE TO Portion of samp Estimated numl Sampling effort	TAL ORGANI:		KICK	MOUTB 9MILE CREEK
SUBSAMFLE TO Portion of samp Estimated numl Sampling effort	le used	3 MS		
Portion of samp Estimated num Sampling effort	le used	3 MS		
Estimated num Sampling effort			329	
Sampling effort	er in total sa		\$3.33%	
		aple	617	
Типе			DURATION 2:30 MIN	UTES / 30 FEET
Distance				
Jabs				
Babitat type				
EPT abundance			167	
Taxa richness			51	
Number EPT tro	LA .		27	
Percent EPT			50 76%	
TAXONOMIC C	OMPOSITION			
GROUP	PERCENT	MTAXA		
Non-insect taxa	1.72%	3		
Odonata	0.00%	0		
Ephemeroptera	20 67%	8		
Piecoptera	9.12%	8		
Beteroptera	0.00%	0		
Megaloptera	0.00%	0		
Trichoptera	20.97%	13		
Lepidoptera	0.00%	0		
Coleoptera	9.73%	6		
Diptera	1.52%	3		
Chiromandae	36.78%	12		

FUNCTIONAL	COMPOSITION		
GROUP	PERCENT	NTAXA	
Predator	17.33%	14	
Paraaste	0.30%	1	
Gatherer	25.84%	17	
Filterer	4.56%	6	
Herbwore	0.00%	0	
Piercer	1,52%	1	
Screper	8.81%	1	
Shredder	41.03%	12	
Ommvore	0.61%	1	
Unknown	0.00%	0	



COMMUNITY TOLERANCES	
Sediment tolerant taxa	1
Percent sedment tolerant	0.61%
Sedanent sensitive train	4
Percent sedment senative	8 51%
Metals tolerance index (McGuire)	2.65
Cold stenotherm tags	8
Percent cold stenothenne	4 86%
HABITUS MEASURES	
Bemogloban beater richness	1
Percent hemoglobic bearers	0.61%
Air-breather nchness	3
Percent az-breathers	1.82%
Burrower richness	3
Percent burrevers	27 66%
Swummer richness	S
Percent swimmers	4 26%

Activity ID:

03-C213-M

Sample Date:	7/26/200	3		
DOMINANCE				
TAXON		ABUNDANCE	PERCENT	
Bulka		ABUNDANCE		
Ironodes		2		
Arctopsyche grandia		2		
Zaitzevia		2	0 6.08%	
Serratella tibaalis		10		
SUBTOTAL S DOMINANT		17		
Lepidostama (turret case)		1		
Rhathrogena		1		
Malenka			3 2 4 3%	
Micraseina			7 2 13%	
TOTAL DOMINANTS		22		
SAPROBITY				
Hilsenhoff Brotic Index			2.81	
DIVERSITY Shaanaa E (loge)			5 16	
Shannon H (log2)			3.58	
Margalef D			8.97	
Sampson D			0.09	
Evenness			0 07	
VOLTINISM				
TYPE		# TAXA	PERCENT	
Multivoltine		17	40 4 3%	
Univoltine		27	40 73%	
Semivoltine		7	18 84%	
TAXA CHARACTERS	#TAXA		PERCENT	
Tolerant	2		7 60%	
Sensitive	8		4 86%	
Clinger	23		44,98%	
BIOASSESSMENT INDIC	ES			
B-IBI (Kasr et al.) METRIC	VALUE		SCORE	
Taxa richnesa	51	· · · · · · · · · · · · · · · · · · ·	5	
E richness	8		3	
P richness	8		s	
T richness	13		5	
Long-laved	7		S	
Sensitive richness	8		5	
%tolerant	7 60%		5	
%predetors	17.33%		3	
Charger achiness %dommence (3)	23 41 95%		5 S	
Soluminies [3]	41 93%	TOTAL SCORE		92%
MONTANA OEQ METRI	S (Bukanti			9279
		Plauna	Valleys and	Mountain
METRIC	VALUE	Ecoregions	Foothills	Ecoregions
Taxa nchness	51	3	3	3
EPT richness	27	3	3	3
and all a st		-	3	3
Biotic Index	2 81	3	3	
MDomment taxes	2 81 26 44%	3	3	2
%Domment taxes %Collectors	26 44% 30 40%	3 3	3	2 3
%Domment taxm %Collectors %EPT	26 44% 30 40% 50 76%	3 3 3	3	2
%Dominant taxim %Collectors %EPT Shannon Diversity	26 44% 30 40% 50 76% 3 58	3 3 3 3	3 3 2	2 3 1
%Domniant taam %Collectors %EPT Shamon Diversity %Scrapers #Shredders	26 44% 30 40% 50 76% 3 58 49 85%	3 3 3 3	3	2 3
%Dominiant taxam %Collectors %EPT Shamon Diversity %Scrapers +Shredders Predator taxa	26 44% 30 40% 50 76% 3 58 49 85% 14	3 3 3 3 3 3	3 3 2	2 3 1
%Dormanant taxam %Collectors %EPT Shamnan Diversity %Scrapers *Bhredders Predator taxa %Multivoltine	26 44% 30 40% 50 76% 3 58 49 85% 14 40 43%	3 3 3 3	3 3 2 3	2 3 1
%Dominant taxim %Collectors %EPT Shamon Diversity %Scrapers +Shredders Predator taxa %Multivoltine %El of T	26 44% 30 40% 50 76% 3 58 49 85% 14	3 3 3 3 3 3 2	3 3 2 3	2 3 1 2
%Dominiant taxim %Gollectors %GET Shannon Diversity %Scrapers *Shredders Predator taxa %Multivoltine %H of T TOTAL SCORES	26 44% 30 40% 50 76% 3 58 49 85% 14 40 43% 39.13%	3 3 3 3 2 29	3 3 2 3 3 23	2 3 1
%Dominant taxim %Collectors %EPT Shamon Diversity %Scrapers +Shredders Predator taxa %Multivoltine %El of T	26 44% 30 40% 50 76% 3 58 49 85% 14 40 43% 39.13%	3 3 3 3 3 3 2	3 3 2 3	2 3 1 2

Montena DEQ metric batteries

Montana Plaine ecorogione metrics (Bramblett and Johnson)

montana Fiame ecorogione metrics in	ram Diett au d. John man)	
Ruffle	Pool	
EPT nchness	27 E nchness	8
Percent EPT	S0 76% T richness	13
Percent Objochaetes and Lesches	0.30% Percent EPT	50 76%
Percent 2 dominants	35.26% Percent non-maect	1.22%
Filterer richness	6 Filterer richness	6
Percent mioleraut	45.90% Univoltine richness	27
Univoltine nchnesa	27 Percent supertolerant	0.61%
Percent chugers	44 98%	
Swimmer rachness	5	

Aquatic Invertebrate Taxonomic Data Site Name MCCORMICK CREEK 250 YDS U/S OF CONFL. OF LTL MCCORMICK CR Data Collected - 7, /24/0002

Date Collected 7 /24/2003 Activity ID 03-C211-M Order Family Taxon Count Percent Unlque **BI FFG** Nematoda 0.33% 1 Yes 5 PA Acarina Acari Acari б 1.99% 5 PR Yes Coleoptera Elmidae Cleptelmis 7 2.32% Yes 4 CGHeterlimnius 20 6.62% 3 CG Yes Lara avara 5 1.66% Yes 1 SH Narpus 1 0.33% Yes 2 CGZaitzevia 8 2.65%Yes 5 CG Diptera Ceratopogonidae Ceratopogoninae 0.33% 1 Yes \mathbf{PR} 6 Chironomidae Brillia 17 5.63% Yes 4 SH Cricotopus (Cricotopus) 0.33% 1 Yes 7 SH Cricotopus (Nostococladius) 0.33% 1 Yes 6 SH Eukiefferiella Gracei Gr. 1 0.33% Yes 8 CGLarsia 0.33% ł Yes 6 \mathbf{PR} **Microtendipes** 12 3.97% Yes 6 CFPagastia $\mathbf{2}$ 0.66% Yes CG 1 Parametriocnemus 0.33% 1 Yes 5 CG Polypedilum 24 7.95% Yes 6 SH Rheocricotopus 0.33% 1 Yes 4 CGRheotanytarsus 18 5.96% Yes CF6 Thienemannimyia Gr. 1 0.33% PR Yes 5 Empididae Oreogeton 1 0.33% Yes 4 \mathbf{PR} Simuliidae Simulium 1 0.33% Yes 6 CFTipulidae Antocha 1 0.33% Yes 3 CG Hexatoma 0.99% 3 Yes 2 \mathbf{PR} Ephemeroptera Ameletidae Ameletus ł 0.33% Yes 0 CG Baetidae Baetis tricaudatus 13 4.30% Yes 4 CG Diphetor hageni 1 0.33% Yes 5 CG Ephemerellidae Caudatella edmundsi 1 0.33% SC Yes 0 Drunella doddsi 2 0.66% Yes PR 1 Drunella spinifera 19 6.29% Yes 0 PR Serratella tibialis 19 6.29% Yes $\mathbf{2}$ CG Heptageniidae Cinygmula 8 2.65% Yes 0 \mathbf{SC} Rhithrogena 3 0.99% CGYes 0 Hapiotazida Enchytracidae Enchytraeidae 2 0.66% Yes 4 CG Plecoptera Chloroperlidae Sweltsa 5 1.66% Yes PR 0 Nemouridae Malenka 2 0.66% Yes 1 SHVisoka cataractae 12 3.97% Yes 0 SH Zapada columbiana 4 1.32% Yes SH2 (Continued.....)

STORET STATION C04MCORC02



Site Name MCCORMICK CREEK 250 YDS U/S OF CONFL. OF LTL STORET STATION C04MCORC02 MCCORMICK CR (...continued from previous page) (...continued from previous page) (...continued from previous page)

	Perlidae						
		Doroneuria	9	2.98%	Yes	0	PR
	Perlodidae						
M -1-b		Megarcys	1	0.33%	Yes	1	PR
Trichoptera	Brachycentridae						
	Diacitycend Rac	Micrasema	30	9.93%	Yes	1	SH
	Hydropsychidae			212010	100	-	
		Arctopsyche grandis	1	0.33%	Yes	2	PR
		Parapsyche elsis	1	0.33%	Yes	1	PR
	Limnephilidae						
	Philopotamidae	Limnephilidae	4	1.32%	Yes	3	SII
	rimopotamidae	Dolophilodes	1	0.33%	Yes	0	CF
	Rhyacophilidae	Dotopradaes	1	0.0070	105	0	Cr
	···· <i>J</i> ··· · <i>I</i> ···· · ·	Rhyacophila Alberta Gr.	2	0.66%	Yes	0	PR
		Rhyacophila Betteni Gr.	3	0.99%	Yes	0	PR
		Rhyacophila Brunnea Gr.	8	2.65%	Yes	2	PR
		Rhyacophila Verrula Gr.	1	0.33%	Yes	0	MH
Tricladida	Discontinue						
	Planariidae	Polycelis coronata	13	4.30%	Yes	1	ОМ
Veneroida		Fongeens coronalia	15	4.30%	res	T	OM
	Pisidiidae						
		Pisidiidae	1	0.33%	Yes	8	CG
Grand Total			302				

1	
	19.0
	× 4
1	

 Aquatic Invertebrate Osta Summary

 Project ID:
 MTDEQ03C04

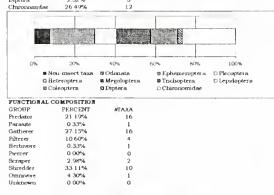
 STOKET Stetion ID:
 COMICORCO2

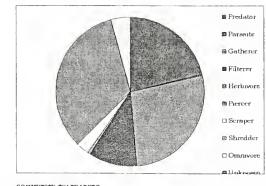
 Station Amme:
 MCCORMICK CREEK 250 YDS U/S OF CONFL_OF LTL MCCORMICK CR

Sample type	KJCK	
SUBSAMPLE TOTAL ORGANIS	M3 302	
Partion of semple used	60.00%	
Estimated number in total sau	aple 503	
Sampling effort		
Time	DURATION 1.30 MI	NUTES / 22 FEET
Distance		
Jabs		
Babitat type		
EFT abundance	151	
Trom richness	51	
Number EPT taxa	24	
Percent EPT	50 00%	

TAXONOMIC COMPOSITION

GROUP	PERCENT	#TAXA	
Non-insect taxa	7 62%	5	
Odonata	0.00%6	0	
Epheneroptera	2219%	9	
Plecoptera	10 93%	6	
[leteropier a	0.00%	0	
Megaloptera	0.00%	0	
Trichoptera	16 89%	9	
Lepidoptera	0.00%	0	
Coleoptera	13.58%	5	
Diptera	2.32%	5	
Champereday	O.C. ACMA	1.0	





COMMUNITY TOLERANCES	
Sedunent tolerant team	2
Percent sediment tolerant	1.32%
Sedunent sensitive taxa	4
Percent sediment sensitive	1.32%
Metals tolerance index (McGuire)	2 28
Cold stenotherm teon	13
Percent cold stenotherms	18.21%
HABITUS MEASURES	
Nemoglobin beater inclineas	2
Percent hemoglobus bearers	11.92%
An breather richness	2
Percent aur-breathers	1 32%
Burrower nchness	4
Percent burrowers	7 28%
Swimmer richness	3
Percent swammers	4.97%

Sample Data:	7/24/2003			
DOMINANCE				
TAXON		ABUNDANCE	PERCENT	
Microsema		30		
Polypedilum		24	7.95%	
Heterimusua		20	6 62%	
Drunella spiratera		15		
Serratella ubialis		19		
SUBTOTAL 5 DOMINANT	s	112		
Rheotauytersus		16		
Brilha		17		
Polycehs cororista Baetis tricaudatus		13		
Visoka cataractae		12		
TOTAL DOMINANTS		18		
Contra pontice interest				
SAPROBITY				
Hilsenhoff Biouc Index			2.74	
OIVERSITY				
Shannon II (loge)			6 26	
Shannon E (log2)			4 34	
Margalef D			8 75	
Sampson D			0.04	
Evenness VOLTINISM			0.09	
TYPE		# TAXA	PERCENT	
Multivoltme		17	37.75%	
Univoltine		27	46.69%	
Semivoltine		7	15 56%	
TAXA CHARACTERS			-	
	AXATH		PERCENT	
Tolerant	2		4 97%	
Senative	13		18.21%	
Clmger	27		65.89%	
BIDASSESSMENT INDIC	28			
B-IBI (Karr et al.)				
METRIC	VALUE		SCORE	
Texa richmens	51		5	
E richness	9		5	
P richness	6		3	
T richness	9		3	
Long-lived	7		5	
Senative richness	13		5	
%tolerant	4 97%		5	
%predators	21 19%		3	
Charger richness	27 24 50%		5	
%dominance (3)	24.30%	TOTAL SCORE	44	8.8%
MONTANA ORQ METRIC	5 (Bukantis			0076
		Plaus	Valleys and	Mounteau
METRIC	VALUE	Ecoregions	Foothills	Ecoregions
Taxa nchness	51	3	3	3
EPT nchness	24	3	3	3
Biotic Index	2.74	3	3	3
%Dominant taxon	9 93%	3	3	3
%Callectors	37 75%	3	3	3
%EPT	50.00%	2	2	1
Shamon Diversity	4 34	3		
%Scrapers +Shredders	36.09%	3	3	1
Predator taxa	16	3		
%Multivoltine	37.75%	3		
%E of T	3.92%		3	
TOTAL SCORES		29	23	17
PERCENT OF MAXIMUM		96.67	95 8.3	80.95
IMPAIRMENT CLASS		NON .	NON	SLIGHT

0	 	
		© Plama Ecoregiona ■ Valleys and Foothills □ Mountain Ecoregiona

Montsna Plaina ecoregiona metrica (B	ramblett and Johnson)	
Riffle	Pool	
EPT netwess	24 E nctmess	9
Percent EPT	50 00% Tinchness	9
Percent Oligochaetes and Leeches	0.66% Percent EPT	50 00%
Percent 2 dominants	17.88% Percent non-insect	7 62%
Filterer nohness	4 Filterer richness	4
Percent intolerent	51.99% Univoltine richness	27
Uravoltine richness	27 Percent supertolerant	0.66%
Percent chagers	65 89%	
Swimmer richness	3	



Aquatic Invertebrate Taxonomic Data Site Name MCCORMICK CREEK 0.25 MI ABV MOUTH

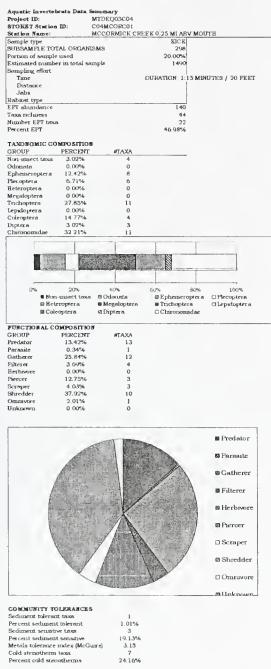
	rtebrate Taxonomic D ACCORMICK CREEK 0.2		STOR	ET STATIC	ON CO4M	CORC	201
Date Collect	ed 7/24/2003		Activi	ty ID	03-C2	09-M	
Order	Family	Taxon	Count	Percent	Unique	BI	FFG
		Nematoda	1	0.34%	Yes	5	PA
Acarlna							
	Acari						
		Acari	1	0.34%	Yes	5	PR
Coleoptera							
	Elmidae	A		-			
		Heterlimnius	23	7.72%	Yes	3	CG
		Lara avara	3	1.01%	Yes	1	SH
		Optioservus Zaitaania	1	0.34%	Yes	5	SC
Distors		Zaitzevia	17	5.70%	Yes	5	CG
Diptera	Chironomidae						
	Cimbilomidae	Brillia	10	3.36%	Yes	4	SH
		Cricotopus (Cricotopus)	9	3.02%	Yes	7	SH
		Cricotopus (Nostococladius)	54	18.12%	Yes	6	SH
		Cricotopus bicinctus	3	1.01%	Yes	7	SH
		Eukiefferiella Devonica Gr.	4	1.34%	Yes	8	CG
		Micropsectra	1	0.34%	Yes	4	CG
		Nilotanypus	1	0.34%	Yes	6	PR
		Pagastia	2	0.67%	Yes	1	CG
		Polypedilum	3	1.01%	Yes	6	SH
		Thienemanniella	3	1.01%	Yes	6	CG
		Thienemannimyia Gr.	6	2.01%	Yes	5	PR
	Empididae						
	Simuliidae	Empididae	2	0.67%	Yes	6	PR
	Tipulidae	Simulium	4	1.34%	Yes	6	CF
		Antocha	3	1.01%	Yes	3	CG
Ephemeropto							
	Baetidae	Destin this surfacture	E	0.010/	Ver	4	66
		Baetis tricaudatus Diphetor hageni	6 1	$2.01\% \\ 0.34\%$	Yes Yes	4 5	CG CG
	Ephemerellidae	Dyneior nugeni	1	0.3170	163	5	CG
	Lipnomotorina de	Drunella coloradensis	2	0.67%	Yes	0	PR
		Drunella spinifera	1	0.34%	Yes	0	PR
		Serratella tibialis	13	4.36%	Yes	2	CG
	Heptageniidae						
		Cinygmula	9	3.02%	Yes	0	SC
		Epeorus longimanus	2	0.67%	Yes	1	SC
		Rhithrogena	3	1.01%	Yes	0	CG
Haplotaxida							
	Enchytraeidae						
		Enchytraeidae	1	0.34%	Yes	4	CG
Plecoptera	Nom availe a						
	Nemouridae	Malenka	2	0.67%	Yes	1	SH
		Malenka Visoka cotaractae	2	0.67%	Yes	0	SH
		Zapada columbiana	2	0.67%	Yes	2	SH
	Perlidae	supran conmentant	<i>6</i> .	0.0770	105	4	
	1 OTMANO	Doroneuria	6	2.01%	Yes	0	PR
		Perlidac	2	0.67%	No	2	PR
	Periodidae				***		
		Megarcys	6	2.01%	Yes	1	\mathbf{PR}
Trichoptera		5 5					
	Brachycentridae						
		Micrasema	25	8.39%	Yes	1	SH

(Continued.....)

Site Name MCCORMICK CREEK 0.25 MI ABV MOUTH (... continued from previous page)

STORET STATION CO4MCORC01

	Hydropsychidae						
		Arctopsyche grandis	2	0.67%	Yes	2	PR
		Hydropsyche	4	1.34%	Yes	5	CF
		Hydropsychidae	2	0.67%	No	4	CF
	Hydroptilidae						~.
		Agraylea	2	0.67%	Yes	8	PH
		Hydroptila	1	0.34%	Yes	6	PH
		Ochrotrichia	35	11.74%	Yes	4	PH
	Philopotamidae						
		Dolophilodes	1	0.34%	Yes	0	CF
	Rhyacophilidae						
		Rhyacophila	4	1.34%	No	1	PR
		Rhyacophila Betteni Gr.	3	1.01%	Yes	0	PR
		Rhyacophila Brunnea Gr.	4	1.34%	Yes	2	PR
Tricladida							
	Planariidae						
		Polycelis coronata	б	2.01%	Yes	1	ОМ
Grand Total			298				



1.01% 1.01% 3 36% 2 2.35%

HABITUS MEASURES
Hemoglobin bearer richness
Percent hemoglohin bearers
Air breather richness
Percent an -breathers
Hurrower richness
Percent burrowers
Switumer richttess
Percent swimmers

	03-C209-M			
Sample Date:	7/24/2003			
DOMINANCE				
TAXON		ABUNDANCE	PERCENT	
Cricotopus (Nostococladia	le)	54		
Ochrotrichia		35		
Micrasema		25		
Reterimmus		23		
Zentzevia		17		
SUBTOTAL 5 DOMINANT	8	154		
Brilka		10		
Cinygmula		10		
Cricotopus (Cricotopus)		ç		
Polycebs carousto		é		
TOTAL DOMINANTS		201		
SAPROBITY Hilsenhoff Biots: Index				
Hisenhol Biotic Index			3 65	
DIVERSITY				
Shannon H (loge)			5.32	
Shannon H (log2)			3 69	
Mergalef D			8.07	
Sampson D			0 07	
Evenness			0.06	
VOLTINISM TYPE		N TAXA	PERCENT	
Multivoltme		19	50.00%	
Umvoltme		20	32 89%	
Semivaltae		3	17 11%	
TAXA CHARACTERS		0		
	ATAXA		PERCENT	
Tolerant	4		18 12%	
Senarave	7		24 16%	
(1)				
Clanger	26		80 20%	
			80 20%	
BIOASSESSMENT INDIC B-IBI (Karr et al.)	es			
BIOASSESSMENT INDIC H-IBI (Karr et al.) METRIC	VALUE		SCORE	
BIOASSESSMENT INDIC H-IBI (Karr et al.) METRIC Taza ricimess	ES VALUE 44		SCORE 5	
BIOASSESSMENT INDIC H-IBI (Karr et al.) METRIC Taza nicimess E nchness	ES VALUE 44 8		SCORE S 3	
BIOASSESSMENT INDIC H-Bil (Karr et al.) METRIC Taza richness E richness P richness	ES VALUE 44 8 6		SCORE S 3 3	
BIOASSESSMEAT INDIC B-IBI (Karr et al.) METMC Taxa richness E richness P richness T richness	ES VALUE 44 8 6 11		SCORE S 3 3 5	
BIOASSESSMENT IBDIC B-BBI (Karr et al.) METRIC Tava richness E nchness P richness T nchness T nchness Long lwed	ES VALUE 44 8 6 11 5		<u>SCORE</u> 5 3 3 5 5 5	
BIOASSESSMENT INDIC B-IBI (Karr et al.) METRIC Taxa nicimess E nchuess P nichuess T nchuess Long-lived Seusaive richness	ES VALUE 44 8 6 11 5 7		<u>SCORE</u> 5 3 3 5 5 5 5 5 5	
BIOASSESSMENT IBDIC B-BBI (Karr et al.) METRIC Tava richness E nchness P richness T nchness T nchness Long lwed	ES VALUE 44 8 6 11 5		<u>SCORE</u> 5 3 3 5 5 5	
BIOASSESSMENT IBDIC H-BI (Karr et al.) METIRC Teor richness E richness F richness Long-lived Sensative richness Wolerant	ES 44 8 6 11 5 7 18 12% 13 42% 26		SCORE 5 3 5 5 5 5 5 3 5 5 5 5 5 5 5 5 5 5	
BIOASSESSMEAT DEDIC H-HEI (Karr et al.) METIAC Toon Rifmens E richness E richness T richness T richness T richness Sensitive richness Wolerant Woredators	VALUE 44 8 6 11 5 7 18 12% 13 42%		SCORE 5 3 5 5 5 5 3 5 5 5 5 5 5	
BIOASSESSMENT INDIC HABI (Karr et al.) METHO Taxa richness E nchuess T nchuess T nchuess Long lived Wolerant %oredators Clinger nchuess %domaience (3)	ES VALUE 44 8 6 11 5 7 18 12% 13 42% 26 38 26%	TOTAL SCORE	SCORE 5 3 5 5 5 5 5 3 5 5 5 5 5 5 5 5 5	88%
BIOASSESSMENT INDIC HABI (Karr et al.) METHO Taxa nichneas E nchuess F nchuess T nchuess Long lived Wolerant Vegredators Cliniger nchuess	ES VALUE 44 8 6 11 5 7 18 12% 13 42% 26 38 26%	1998)	SCORE 5 3 5 5 5 5 5 5 5 5 44	
BIOASSESSMENT INDIC HABI (Karr et al.) METHO Taxa richness E nchuess T nchuess T nchuess Long lived Wolerant %oredators Clinger nchuess %domaience (3)	ES VALUE 44 8 6 11 5 7 18 12% 13 42% 26 38 26%	1998) Plans	SCORE 5 3 5 5 5 5 3 5 5 5 5 5 5	Monistans
BIOASSESSMENT INDIC HABI (Karr et al.) METRIC Taxa richness E nchuess F nchuess I nchuess Long lived Valorant Varedators Clinger nchuess MONTANA DRQ METRIC METRIC	ES VALUE 44 8 6 11 5 7 18 12% 13 42% 26 38 26% S (Buk noting VALUE	1998) Plans Ecoregions	SCORE 5 3 5 5 5 3 5 3 5 3 4 4 Volleys and Foothills	Mountain Ecoregions
BIOASSESSMEAT INDIC HUBI (Karr et al.) METRIC Taxa ficturess E richness E richness T richness T richness Change wed Sensitive richness Violerant Synchitors Clinger richness Violerant MOSTAN DRQ METRIC MOSTAN DRQ METRIC	ES <u>VALUE</u> 44 8 6 11 5 7 18 12% 26 38 26% 38 26% VALUE 44	1998) Plans Ecoregions 3	SCORE 3 3 5 5 5 3 3 5 5 5 4 4 Valleys and Foothills 3 3 3 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5	Monistana Ecoregions 3
BIOASSESSMENT INDIC HABI (Karr et al.) METRIC Taxa richness E nchuess F nchuess I nchuess Long lived Valorant Varedators Clinger nchuess MONTANA DRQ METRIC METRIC	ES VALUE 44 8 6 11 5 7 18 12% 13 42% 26 38 26% S (Buk noting VALUE	1998) Plans Ecoregions	SCORE 5 3 5 5 5 3 5 3 5 3 4 4 Volleys and Foothills	Mountain Ecoregions
BIOASSESSMENT INDIC HABI (Karr et al.) METRO Taxa richness E nchuess F nchuess T nchuess Long-lived Wolerant %oredators Clinger nchuess %domaismoe [3] MOSTANA DRQ METRIC METRIC Taxa nchuess EPT nchuess	E5 VALUE 44 8 6 11 5 7 18 12% 13 42% 26 38.26% S (Buk entise VALUE 44 22	1998) Plans Ecoregions 3 3	SCORE 5 3 5 5 5 3 5 5 5 5 5 4 4 4 Valleys and Footbills 3 3	Mountain Ecoregions 3 3
BIOASSESSMENT INDIC HABI (Karr et al.) METRIC Taxa richness E richness E richness T richness T richness Chaiger nichness Walerant Vepredators Chaiger nichness Scissiones (3) MOSTATA DEQ METRIC METRIC Taxa nichness EFT richness EFT richness EFT richness EFT richness	ES VALUE 44 8 6 11 5 7 18 12% 26 38.26% VALUE VALUE 44 22 3.65	1998) Plans Ecoregions 3 3 3 3 3 3 3 3	SCORE 5 3 5 5 5 3 5 5 5 3 5 4 4 Valleys and Foothils 3 3 3 3 3 3 3 3 3 3 3 3 3	Mountain Ecoregions 3 3 2
BIOASSESSMENT INDIC HABI (Karr et al.) METHO Taxa sicinces P sichness P sichness P sichness T schness T schness Schatter Schatter Moderant Sensitive sichness Schotter MOSTANA DEQ METRIC METRIC Taxa schness EVT sichness Biote Index %Communit teem. %Collectors	ES VALDE 44 8 6 11 13 42% 26 38.26% 38.26% VALDE 43 20 38.26% VALDE 44 22 3.65 18.12% 44 22 3.65 18.12% 44 22 3.65 18.12% 44 25 25 25 25 25 25 25 25 25 25	1998) Plana Ecoregions 3 3 3 3 3 3 2	SCORE 5 3 5 5 5 5 5 5 5 5 5 4 4 4 Volleys and Footbills 3 3 3 3	Mountain Ecoregions 3 3 2 3
BIOASSESSMEAT INDIC BABI (Karr et al.) METRIC Taxa richness E richness E richness T richness T richness Cong. Inved Sensitive richness Wolerant Wolerant Chinger richness MOBTATA DRQ METRIC METRIC Tran nichness EPT richness Biouc Index MCOBIENT Succoundex MCOBIENT Succoundex MCOBIENT Succoundex MCOBIENT Succoundex MCOBIENT Succoundex MCOBIENT Succoundex MCOBIENT Succoundex MCOBIENT Succoundex MCOBIENT Succoundex MCOBIENT Succoundex MCOBIENT Succoundex MCOBIENT Succoundex MCOBIENT Succoundex MCOBIENT MCOBIE	ES VALUE 44 8 6 11 5 7 7 18 12% 26 38.26% VALUE VALUE 44 42 22 3.65 18.12% 44 29.33% 46.98% 3.69%	1998) Planos Ecoregions 3 3 3 3 3 2 3 3	SCORE 5 3 5 5 5 5 5 5 5 5 5 5 5 4 4 Valleys and Foothilts 3 3 3 2	Mountain Ecoregions 3 3 2 3 3 1
BIOASSESSMENT INDIC HAR (Karret al.) METHO Texe sciences Enchures Prichness I schures Use and the sciences Sensitive richness Molerant Sensitive richness Sederators Clinger schuress MORTAN DEQ METRIC METRIC Texe schuress EVT sciences Biote Index %Common Uversity %Corport +Shredders	E5 VALUE 44 8 6 11 13 26 38.26% VALUE VALUE 44 22 3.65 18.12% 44 93.3% 18.12% 44.98% 3.69% 18.12% 44.98% 3.69% 3.69% 44.93% 44.94% 44.95% 44.95% 44.95% 44.95% 4	1998) Planos Ecoregions 3 3 3 3 3 3 3 3 3 3 3 3 3	SCORE 5 3 5 5 5 3 5 5 5 3 5 4 4 Valleys and Foothils 3 3 3 3 3 3 3 3 3 3 3 3 3	Mountaun Ecoregions 3 3 2 3 3 3 3
BIOASSESSMEAT INDIC HABI (Karr et al.) METRIC Taxa richness E richness E richness T richness T richness Chage richness Sensitive richness Molerant Moreators Clinger richness Montana DRQ METRIC METRIC Tean richness Evalue Index Moominant taxen Moontana Chaess EPT richness Evalue Index Mooninant taxen Moontana Sheroit Metric Sheroit Diversity Metric Sheroit Diversity Michaes Sherders	ES VALUE 44 8 6 11 5 7 7 18 12% 26 38 26% 38 26% 38 26% VALUE 44 42 23 3.65 18,12% 44 29 33% 40,98% 3,6% 13 40,98% 3,6% 14 14 15 16 17 16 16 16 16 16 16 16 16 16 16	1998) Plans <u>Ecoregions</u> 3 3 3 3 3 3 3 3 3 3 3 3 3	SCORE 5 3 5 5 5 5 5 5 5 5 5 5 5 4 4 Valleys and Foothilts 3 3 3 2	Mountain Ecoregions 3 3 2 3 3 1
BIOASSESSMENT INDIC HAR (Marret al.) METHO Texe sciences Fishness Prichness Prichness Dang lived Sensitive richness Molerant Sensitive richness Molerant Sensitive richness Molerant Sensitive richness Montana DRQ METRIC METRIC Taxa nchness EVT richness Biouc Index METRIC Taxa nchness EVT richness Biouc Index Metric Stamont Dversity "Scarpers +Shredders Prediator taxa	E5 VALUE 44 8 6 13 12% 26 38.26% 5 (Buk actie VALUE 44 22 3.65 18,12% 429 33.26% 18,12% 46,98% 36% 36% 18,12% 41,03% 18,12% 44,03% 46	1998) Planos Ecoregions 3 3 3 3 3 3 3 3 3 3 3 3 3	SCORE 5 3 5 5 5 5 5 4 4 Valleys and Foothills 3 3 3 2 2 3	Mountain Ecoregions 3 3 2 3 3 1
BIOASSESSMEAT INDIC HABI (Karr et al.) METRIC Taxa richness E richness E richness T richness T richness Sensitive richness Molerant Sensitive richness Molerant Sensitive richness Molerant Ginger richness Montal A DRQ METRIC METRIC Town nichness EVT richness Biote Index MoDernant town %Collectors %EPT Shemon Diversity %Scrapers +Shireders Preditor town %Millwoltme MEI of	ES VALUE 44 8 6 11 5 7 7 18 12% 26 38 26% 38 26% 38 26% VALUE 44 42 23 3.65 18,12% 44 29 33% 40,98% 3,6% 13 40,98% 3,6% 14 14 15 16 17 16 16 16 16 16 16 16 16 16 16	1998) Plauras Ecoregious 3 3 3 3 3 3 3 3 3 3 3 3 3	SCORE 5 3 5 5 5 5 5 5 5 5 5 5 4 4 Valleys and Foothils 3 3 3 3 3 3 3 3 3 3 3 3 3	Mountann Ecoregians 3 3 2 3 3 1 2 2 2
BIOASSESSMENT INDIC HAR (Marret al.) METHO Texe sciences Fishness Prichness Prichness Dang lived Sensitive richness Molerant Sensitive richness Molerant Sensitive richness Molerant Sensitive richness Montana DRQ METRIC METRIC Taxa nchness EVT richness Biouc Index METRIC Taxa nchness EVT richness Biouc Index Metric Stamont Dversity "Scarpers +Shredders Prediator taxa	E5 VALUE 44 8 6 13 12% 26 38.26% 5 (Buk actie VALUE 44 22 3.65 18,12% 429 33.26% 18,12% 46,98% 36% 36% 18,12% 41,03% 18,12% 44,03% 46	1998) Plans <u>Ecoregions</u> 3 3 3 3 3 3 3 3 3 3 3 3 3	SCORE 5 3 5 5 5 5 5 4 4 Valleys and Foothills 3 3 3 2 2 3	Mountain Ecoregions 3 3 2 3 3 1

	Montana DEQ met	nic battenes
Par court of land way way to 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		© Plans Ecoregions ■ Valleys and Foothills □ Mountain Ecoregions

Montana Plains scoregions metrics (Bramblett and Johnson)

Refile	Pool	
EPT richwas	22 E richness	8
Percent EPT	46.98% Tinchness	11
Percent Oligochaetes and Leeches	0.34% Percent EPT	46 98%
Percent 2 dominants	29 87% Percent non-insect	3 02%
Filterer richness	4 Filterer richness	4
Percent intolerent	33 56% Univoltine richness	20
Univoltine richness	20 Percent supertolerant	2 01%
Percent chugers	80.20%	
Swimmer richness	2	

Aquatic Invertebrate Taxonomic Data Site Name CEDAR CREEK .5-.75 MI UP STARK MTN. TRAIL #58 ABV FS STORET STATION C04CEDRC01

Date Collect	ed 7/29/2003		Activi	ty ID	03-C2	15-№	1
Order	Family	Тахор	Count	Percent	Unique	BI	FFG
		Ostracoda	1	0.30%	Yes	8	CG
Acarina	Acari						
	ncan	Асагі	5	1.52%	Yes	5	PR
Basommatop	hora Planorbidae		Ŭ	10170	100	Ŭ	1 11
		Gyraulus	1	0.30%	Yes	8	SC
Coleoptera							
	Elmidae	Objectation	<i>.</i>	1 0 0 0 1	••		
		Cleptelmis	6	1.82%	Yes	4	CG
		Lara avara	2	0.61%	Yes	1	S11
		Narpus	2	0.61%	Yes	2	CG
Diptera		Zaitzevia	2	0.61%	Yes	5	CG
Diptera	Ceratopogonidae						
	SourceboRoundie	Ceratopogoninae	1	0.30%	Yes	6	PR
	Chironomidae	oeracopogormiae	1	0.3070	105	U	11
		Brillia	24	7.29%	Yes	4	SH
		Cricotopus (Cricotopus)	4	1.22%	Yes	7	SH
		Eukiefferiella Brehmi Gr.	3	0.91%	Yes	8	CG
		Eukiefferiella Devonica Gr.	11	3.34%	Yes	8	CG
		Micropsectra	8	2.43%	Yes	4	CG
		Parametriocnemus	1	0,30%	Yes	5	CG
		Pseudodiamesa	1	0.30%	Yes	2	CG
		Tvetenia	4	1.22%	Yes	5	CG
	Empididae			1.44/0	103	J	CG
	Simuliidae	Oreogeton	4	1.22%	Yes	4	PR
		Prosimulium	35	10.64%	Yes	4	CF
		Simulium	5	1.52%	Yes	6	CF
	Tipulidae			110 2,10	100	0	01
		Dieranota	1	0.30%	Yes	3	PR
		Tipula	2	0.61%	Yes	4	SH
Ephemeropte							
	Baetidae						
	Ephemerellidae	Baetis tricaudatus	10	3.04%	Yes	4	CG
		Drunella doddsi	1	0.30%	Yes	1	PR
		Drunella spinifera	6	1.82%	Yes	0	PR
		Serratella tibialis	39	11.85%	Yes	2	CG
	Heptageniidae						
		Cinygmula	12	3.65%	Yes	0	SC
		Ironodes	4	1.22%	Yes	0	SC
	Lenterblah	Rhithrogena	13	3.95%	Yes	0	CG
	Leptophlebiidae	Development of the film					
Plecoptera		Paraleptophlebia	2	0.61%	Yes	1	CG
	Chloroperlidae						
	emotopernute	Sweltsa	0	0 6 10/	N	0	DD
	Nemouridae	UMCH34	2	0.61%	Yes	0	PR
	may the state	Visoka cataractae	11	2.249/	V	0	G 17
		Zapada columbiana		3.34%	Yes	0	SH
		Zapada Oregonensis Gr.	4	1.22%	Yes	2	SH
	Peltoperlidae	supara oregonolista OL	1	0.30%	Yes	2	SH
	1	Yoraperla brevis	18	5.47%	Yes	0	011
	Perlidae	T of the brooks	10	J. T / 70	162	0	SH
		Doroneuria	10	3.04%	Yes	0	PR

(Continued.....)

 Name
 CEDAR CREEK .5-.75 MI UP STARK MTN. TRAIL #58 ABV FS STORET STATION C04CEDRC01 (...continued from previous page)

	Perlodidae						
		Megorcys	1	0.30%	Yes	1	PR
		Setvena	1	0.30%	Yes	2	PR
Trichoptera							
	Brachycentridae						
	-	Micrasema	17	5.17%	Yes	1	SH
	Hydropsychidae						
		Arctopsychinae	3	0.91%	No	2	PR
		Parapsyche elsis	14	4.26%	Yes	1	PR
	Limnephilidae	1 5					
	· F	Dicosmoecus	2	0.61%	Yes	2	SC
	Philopotamidae		-	010170	100		20
	····	Philopotamidae	2	0.61%	Yes	3	CF
	Rhyacophilidae	1 mopoulainado	2	0.0170	100	0	с.
	in juoopininuuo	Rhyacophila	2	0.61%	No	1	PR
		Rhyacophila Betteni Gr.	4	1.22%	Yes	Ó	PR
		Rhyacophila Brunnea Gr.	8	2.43%	Yes	2	PR
Tricladida		Miljacopinia Diatinoa or.	0	2.1070	103	4	1 1
ATTCIAUTUA	Planariidae						
	1 Ianan juac	Polycelis coronata	19	5,78%	Yes	1	OM
Grand Total		roigens coronata	329	J.7 0%	res	1	OM

uquatic Invertebrate Data Summary toject ID: MTDEQ03C04 TODET Service DC COACEDBOD1	Activity ID: 03-C215-M
ORET Station ID: C04CEORC01 ation Name: CEDAR CREEK 5-75 MI UP STARK MTN TRAIL #58 AB	*S 5515 Sample Date: 7/29/2003
mple type KICK BSAMPLE TOTAL ORGANISMS 329	DOMIRABCE
ortion of sample used 45 00%	TAXON ABUNDANCE PERCENT
stimated number in total sample 731 ampling effort	Secratella tibusha 39 11.85% Prosimularin 35 10.64%
Time DURATION 2 10 MINUTES / 20 FEET	Brilha 24 7.29%
Distance	Polycelis coronata 19 5.78% Yoraperla brevis 18 5.47%
Jabe	SUBTOTAL S DOMINANTS 135 41 03%
PT abundance 187	Мистански 17 5.17%
ava nchness 44	Parapayche elsus 14 4 26% Rhuthrogena 13 3 95%
lumber EPT teos 22 Vercent EPT 56.84%	Carygmula . 12 3 65%
	Visoka cataractae 11 3,34%
AXONOMIC COMPOSITION ROUP PERCENT #TAXA	TOTAL DOMINANTS 202 61.40%
on insect taxa 7.90% 4	SAPROBITY
donata 0.00% 0	Hilsenhoff Biotic Index 2 42
Conterna 26 44% 8 Necoptera 14 59% 8	DIVERSITY
leteroptera 0.00% 0	Shannon H (loge) 5 96
fegaloptera 0.00% 0 Trichoptera 15.81% 8	Shannon H (log2) 4 14 Margalef D 7 76
inchoptera 15.81% 8 epidoptera 0.00% 0	Simpeon D 005
oleoptera 3.65% 4	Evenness 0.09
hptera 14.59% 6 hpronomidae 17 02% 8	VOLTINISMI TYPE NTAXA PERCENT
Chronomidae 17 02% 8	Multivoltine 12 27.66%
	Univoltine 27 61.09%
	Semvoltme 5 11 25% TAXA CHARACTERS
	#TAXA PERCENT
	Tolerant J 2.74% Sensitive J0 21.28%
0% 20% 40% 60% 80% 100%	Sensitive 10 21 28% Clinger 20 60 79%
Non-maect tests EOdonato EEphemeroptera Plecoptera	
© Heteroptera ■ Megaloptera ■ Tricboptera O Lepidoptera ■ Coleoptera ◎ Diptera □ Chironomidae	BIOASSESSMENT INDICES
a conceptera proposa Elementamidae	B-IBI (Karr et al.) METRIC VALUE SCORE
PUNCTIONAL COMPOSITION	Taxa nchness 44 5
GROUP PERCENT #TAXA Tedator 19.15% 15	Enchnese 8 3 Prichnese 8 5
redator 19.15% 15 Paranite 0.00% 0	T nchnees 8 3
Gatherer 31.31% 14	Long-loved 5 S
Pilterer 12.77% 3 Verbryore 0.00% 0	Sensitive incliness 10 S %tolerant 2.74% 5
Herbrone 0.00% 0 Hercer 0.00% 0	%toterant 2/1% 5 %predators 19.15% 3
Screper 5.78% 4	Clinger nchness 20 3
Shredder 25.23% 9 Omnivore 5.78% 1	%dominance [3] 29.79% 5 TOTAL SCORE 42 84%
Julinvore 5.78% 1 Julinawa 0.00% 0	BORTARA DEQ METRICS (Bukantis 1998)
	Plans Valleys and Mountain
	METRIC VALUE Ecoregions Poothalls Ecoregions
# Predator	Taxa nchnesis 44 3 3 3 EPT nchness 22 3 3 3
	Biote index 2 42 3 3 3
N Parasite	%Dominant taxon 11 85% 3 3 3
	%Collectors 44 07% 3 3 3 %EPT 56.84% 3 2 2
□ Gatherer	Shannon Dreeraity 4 14 3
	%Scrapens+Shredders 31.00% 3 3 1
# Filterer	Predator taxa IS 3 %Multrvoltme 27.66% 3
Herbivore	%H of T 32.69% 3
m iteroivoie	TOTAL SCORES 30 23 18
B Piercer	PERCENT OF MAXIMUM 100 00 95 83 85 71 IMPAIRMENT CLASS NON NON NON
□ Scraper	
	Montana DEQ metric batteries
B Shredder	100
Omnivore	80
UUmnivore	80
COM MUNITY TOLERANCES	B0 B0 ■ Plains Ecoregions
Sedsment tolerant taxa 3	50 Valleys and Foothills
Percent sedurent tøleraut 1 22%	So Valleys and Foothills So One So On
eduneut sensitive toos	30
Percent sedment sensitive 4.26%	05
Percent sediment sensitive 4,26% Metals talerance index (McGuire) 2,24	0
Priceal sediment sensitive 4.26% Metals talerance index (McGuire) 2.24 Old stenotherm taxe 9	
Priveul sedment senantre 4.26% Metals talerance mzlez (McGure) 2.24 Cold stenutherm taxa 9 Percent cold stenutherns 20.97%	
Percent sedurent sensitive 4.26% Metals talerance unlex (McGurre) 2.24 Cold stenuthern taxa 9 Percent cold stenuthernos 20.97% RABITUS MEASURES	Montana Plains scoregions metrics (Brambiett and Johnson)
Percent sedment senantive 4.26% Metals talerance nules (McGurre) 2.24 Cold stenotherm taxa 9 Percent cold stenotherms 20.97% BABITUS MEASURES Henogolom beneter nchiness 1	Rifle Pool
Percent sedment senantore 1.26% Metals talerance nules (McGurre) 2.24 Cold stenotherm taxa 9 Percent cold steputherms 20.97% BABITUS MEASURES Hanoglobin beater richness 1 Percent hemoglobin beaters 0.30% Art breather nchuress 2	Riffle Pool EPT richness 22 E richness 8
Percenti sediment sensitive 4.26% Metals talerance index (McGure) 2.24 Cold stenotherm taxin 9 Percenti cold stenotherms 20.97% HABITOS MEASURES Hemoglobin bearer incluies 1 Percent incluies 2 Air brenther incluies 2 Percent incluies 2 Out 6	Riffle Post EPT nchuress 22 E nchness 8 Percent EPT 56 84% T nchuress 8 Percent Outpocheetes and leeches 0.00% Percent EPT 56 84%
Percent sedment sensitive 1.26% Metals talerance nukes (McGuire) 2.24 Cold stenotherm taxs 20.9% BABITUS MEASURES HABITUS MEASURES Percent themoglobin bearer inchines 1 Percent themoglobin bearers 0.30% Air bendler inchines 2 Percent arc-breathers 0.91% Burrower inchines 5	Rtfle Pod EPT richness 22 Einchness 8 Percent EPT 56 84% Tichness 8 Percent Objechetes and Leeches 0 00% Percent EPT 56 84% Percent 2 dominants 22 49% Percent in suscet 7.90%
Percent architest sensative 4,26% Metals talerance undex (McGuire) 2,24 Cold stemutherm taxin 9 Percent cold stemutherms 20,97% HABITOS MEASURES Hemoglobin bearer richitess 1 Percent architess 2,30% Ar brendher inclutess 2,1%	Rtfle Pod EPT nchness 22 Enchness 8 Percent EPT 56 84% Tichuras 8 Percent Objechaetes and Leeches 0.00% Percent EPT 56 84% Percent 2 dominants 22 49% Percent non-meet 7.90% Pilterer nchness 3 Pilterer nchness 3
Percent sedmovers Metals talerance undex (McGurre) 2.24 Cold stemutherm taxa 9 Percent cold stemutherms 20.97% HABITUS MEASURES Hemoglobin bearer achiness 1 Percent hemoglobin bearers 0.30% Ar breather achiness 2 Percent arc-breathers 0.91% Burrower richness 5 Percent unrowers 9,73%	Rtfle Pod EPT nchness 22 Enchness 8 Fercent EPT 56 84% Tichuras 8 Percent Objechaetes and Leeches 0.00% Percent EPT 56 84% Percent 2 dominants 22 49% Percent non-meet 7.90% Filterer nchness 3 2 Hizer nchness 3

once manne ,	STORT CREEK ABOUT	250 YDS ABV FR 5490 XING	SIOR	ET STATIC	ON CO4SI	MIC	.01
Date Collec	ted 7/24/2003		Activi	ty ID	03-C2	08-N	1
Order Acarina	Family	Taxon	Count	Percent	Unique	BI	FF
	Acari						
		Асагі	1	0.34%	Yes	5	PR
Coleoptera	Dutingidog						
	Dytiscidae	Sanfilippodytes	1	0.240/	V		
	Elmidae	ounimprouges	1	0.34%	Yes		
		Cleptelmis	3	1.01%	Yes	4	С
		Heterlimnius	1	0.34%	Yes	3	C
)iptera	C 1.1						
	Chironomidae	D 111					
		Brillia	11	3.69%	Yes	4	SI
		<i>Corynoneura</i> Eukiefferiella Devonica Gr.	1	0.34%	Yes	7	C
		Heterotrissocladius	2 3	0.67% 1.01%	Yes Yes	8	C
		Micropsectra	35	11.74%	Yes	0 4	C C
		Parametriocnemus	2	0.67%	Yes	5	C
		Rheocricotopus	4	1.34%	Yes	4	C
		Thienemanniella	1	0.34%	Yes	6	C
		Thienemannimyia Gr.	4	1.34%	Yes	5	PI
	Simulity -	Tvetenia	2	0.67%	Yes	5	C
	Simuliidae	Prosimulium	2	1 0 10/			
		Simulium	3 15	1.01%	Yes	4	CI
phemeropt	era	Omutani	15	5.03%	Yes	6	CI
	Ameletidae						
		Ameletus	17	5.70%	Yes	0	C
	Baetidae						
		Diphetor hageni	3	1.01%	Yes	5	C
	Ephemerellidae						
		Drunella coloradensis	1.	0.34%	Yes	0	PF
		Drunella spinifera Serratella tibialis	1 12	0.34%	Yes	0	PF
	Heptageniidae	Gentalena nonais	12	4.03%	Yes	2	C
	110 Progenitatio	Cinygma	б	2.01%	Yes	0	S
		Cinygmula	3	1.01%	Yes	õ	s
		Epeorus deceptivus	1	0.34%	Yes	0	S
	Leptophlebiidae						
		Paraleptophlebia	4	1.34%	Yes	1	C
lecoptera	Chloroparlidea						
	Chloroperlidae	Sweltsa	2	0.670/	V	0	br
	Nemouridae	Sacisa	2	0.67%	Yes	0	PF
		Visoka cataractae	8	2.68%	Yes	0	SF
		Zapada columbiana	5	1.68%	Yes	2	SF
		Zapada Oregonensis Gr.	3	1.01%	Yes	2	SF
	Peltoperlidae						
	D 1 - 3 1 1 -	Yoraperla brevis	14	4.70%	Yes	0	SF
	Perlodidae	E . t	0				
richoptera		Setvena	3	1.01%	Yes	2	PR
	Brachycentridae						
	2. doily conditioned	Micrasema	47	15.77%	Yes	1	SI
	Hydropsychidae				.03	*	54
	-	Parapsyche elsis	5	1.68%	Yes	1	PF
	Limnephilidae						
		Chyrandra centralis	1	0.34%	Yes	2	SF
		Cryptochia	2	0.67%	Yes	0	SF
		Dicosmoecus gilvipes	2	0.67%	Yes	2	SC
		Limnephilidae	3	1.01%	Yes	3	SF

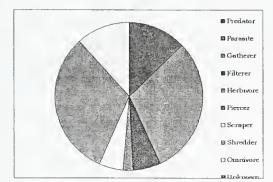
(Continued.....)

Site Name STONY CREEK ABOUT 250 YDS ABV FR 5490 XING (...continued from previous page)

STORET STATION CO4STNYC01

	Rhyacophilidae						
		Rhyacophila Betteni Gr.	8	2.68%	Yes	0	PR
		Rhyacophila Brunnea Gr.	2	0.67%	Yes	2	PR
		Rhyacophila Iranda Gr.	9	3.02%	Yes	0	PR
		Rhyacophila narvae	2	0.67%	Yes	0	PR
		Rhyacophila Verrula Gr.	7	2.35%	Yes	0	MH
	Uenoidae						
		Neothremma	3	1.01%	Yes	1	SC
Tricladida							
	Planariidae						
		Polycelis coronata	35	11.74%	Yes	1	OM
Grand Total			298				

Project ID:		rato Data S	MTDEQ03C04			
STORET S	tation	ID:	C04STNYC01			
Station Na	stae:		STONY CREEK A	BOOT 250 YDS.	ABV FR	2 5490 XING
Seanple typ				KICK		
		AL ORGANI	SMS	298		
Partson of a				36 67%		
		r in total sa	mple	813		
Samphng e	fort			DUDATION		
Distanc				DORATION, I.	N MIN	UTES / 18 FEET
Jaba	с.					
Habstat typ	HC .					
EPT abund				174		
Taon richne				44		
Number EF	T taxa			27		
Percent EP	T			58 39%		
	IC CO	MPOSITION				
GROUP		PERCENT	#TAXA			
Non-insect	taxa	12.08%	2			
Odonata		0 00% 16.11%	0			
Ephemerop Plecoptera	uer a	10.11%	6			
Hecoptera Heteroptera		0.00%	0			
Megalopter		0.00%	0			
Frichoptera		30.54%	12			
Lepadoptera		0.00%	0			
Coleoptera		1 68%	3			
Diptera		6 04%	2			
Chironomic	iac	21.81%	10			
-		- 1				
1		1	1	-		:
	2.	都設造習	A GARAGE	AL A BASIL	8	
		and the second second	3.6.5	AT LAND		1
			-			
1						
0%		20%	40%	617%	80%	100%
		-insect taxa		@ Ephemer		🗆 Plecoptera
		roptera	■ Megaloptera	Trichopte		🗆 Lepidoptera
	@ Cold	optera	🛚 Diptera	🗆 Charonor	nidae	
memor	AL CO	MPOSITIO				
GROUP	- m CO	PERCENT	∎ #TAXA			
Predator		12.75%	11			
Paramie		0 00%	0			
Gatherer		30.20%	14			
Filterer		6 04%	2			
Herbrore		2,35%	1			
Percer		0.00%	0			
Scraper		5 0.3%	5			
Shredder		31.54%	9			
Ounravore		11.74%	1			
Juknewn			0			



COMMUNITY TOLERANCES	
Sediment tolerant tana	0
Percent sedunent toleraut	0.00%
Sediment sensitive troop	1
Percent sedment senative	1 68%
Metals tolerance index (McGure)	1.92
Cold stenotherm toon	11
Percent cold stenotherms	17.79%
HABITUS MEASURES	
Hemoglobin bearer nchness	0
Percent hemoglobin bearers	0.00%
As breather richness	1
Percent or -breathers	0.34%
Butrower inchness	1
Percent burrowers	3.69%
Swimmer richness	3
Percent swimmers	8.05%

Activity ID:	03-C208-M			
Sample Date:	7/24/2003			
DOMINANCE				
TAXON		ABUNDANCE	PERCENT	
Містазета		ABOILDAILCE	17 15.77%	
Polycehs corocata		4	35 11.74%	
Micropsectra			35 11.74%	
Ameletus			7 5.70%	
SUBTOTAL 5 DOMINANT			5.03%	
Yoraperla brevis			49 50.00% 14 4.70%	
Serratella tibialis			2 4 03%	
Brillia			11 3 69%	
Rhyacophila Iranda Gr			9 3.02%	
Visoka cataractae			8 2.68%	
TOTAL DOMINANTS			03 68,12%	
SAPROBITY				
Hilsenhoff Hiotic Index			1.90	
DIVERSITY Sharmon H (loss)				
Shannon H (loge) Shannan H (log2)			3 28 3 67	
Margalef D			7.54	
Simpson O			0 07	
Evenness			0.08	
VOLTINISM		A		
TYPE		# TAXA	PERCENT	
Multivoltme Univoltme		13 26	34 90% 61 07%	
Semivoltine		5	4.03%	
TAXA CHARACTERS		0	1.00.0	
	#TAXA		PERCENT	
Tolerant.	1		1 01%	
Sensitive	13		19 80%	
Clinger	ĻВ		46 98%	
BIOASSESSMENT INDI	288			
B-IBI (Karr et al.)				
METRIC Taxa richness	VALUE 44		SCORE 5	
E richness	9		5	
P richness	6		3	
T tichness	12		5	
Long-hved	5		5	
Sensative richness	13		5	
%tolerant %predators	1 01% 12.75%		5 3	
Clinger richness	18.73%		3	
%dominance (3)	39 26%		5	
		TOTAL SCOR	E 44	88%
MONTANA DEQ METRI	35 (Bukantis	1998) Flains	Valleys and	Mountern
METRIC	VALUE	Ecoregious	Foothils	Ecoregions
Texa richness	44	3	3	3
EPT richness	27	3	3	3
Biotic Index	1.90	3	3	3
%Dominant teoron	15 77%	3	3	3
%Collectors	36 24%	3	3	3
%EPT Shannon Diversity	58 39% 3 67	3	2	2
%Scrapers +Shredders	36.58%	3	3	1
Predator taxa	11	3	5	
%Multivoltine	34.90%	3		
%H of T	5.49%		3	
TOTAL SCORES		30	23	18
PERCENT OF MAXIMUM IMPAIRMENT CLASS		100,00 NON	95.83 NON	85.71 NON

Montana DEQ metric batteries Percentofonexienena care Plans Ecoregions
 Valleys and Footbulls Mountain Ecoregions

corrections metrics (Bramblett and Johnson) Plain

Ryfile	Pool	
EPT richness	27 E nchuesa	
Percent EPT	58 39% Trichness	1
Percent Objochaetes and Leeches	0 00% Percent EPT	58.39%
Percent 2 dominants	27.52% Percent non-insect	12.08%
Futerer richness	2 Filterer tichness	
Percent miolerant	69 46% Univoltine richness	2
Unsvoltine richness	26 Percent supertolerast	0.67%
Percent chagers	10.98%	
Swimmer richness	3	

D	Site Name STONY CREEK 0.25 MI U/S MOUTH 9 MILE CREEK				ON CO4STNYCO2		
Date Collected 7 /23/2003			Activity ID		03-C207-M		
Order Acarina	Femily	Тахов	Count	Percent	Unique	BI	FI
	Acari						
Coleoptera		Асагі	2	0.65%	Yes	5	P
oleoptera	Elmidae						
	L'innuac	Cleptelmis	9	2.91%	Vac	4	
		Elmidae	9 4	1.29%	Yes	4	(
		Heterlimnius	15	4.85%	No	4	(
		Lara avara	13		Yes	3	(
		Zaitzevia	1	0.32% 0.32%	Yes	1 5	5
Diptera		20012CD 00	1	0.3270	Yes	5	(
	Chironomidae						
		Brillia	3	0.97%	Yes	4	5
		Cricotopus (Cricotopus)	4	1.29%	Yes	7	5
		Cricotopus (Nostococladius)	11	3.56%	Yes	6	
		Eukiefferiella Devonica Gr.	3	0.97%	Yes	8	Ì
		Eukiefferiella Gracei Gr.	1	0.32%	Yes	8	Ì
		Eukiefferiella Pseudomontana Gr.	2	0.65%	Yes	8	Ì
		Micropsectra	6	1.94%	Yes	4	Ì
		Orthocladaus	2	0.65%	Yes	6	Ì
		Pagastia	38	12.30%	Yes	1	Ì
		Rheocricotopus	1	0.32%	Yes	4	Ò
		Symposiocladius	1	0.32%	Yes	5	9
		Tvetenia	42	13.59%	Yes	5	ò
	Ephydridae		.2	10.0970	105	5	
		Ephydridae	1	0.32%	Yes	6	C
	Simuliidae		-	0.0270	104	ŭ	
		Simulium	8	2.59%	Yes	6	C
	Tipulidae						
		Dicranota	1	0.32%	Yes	3	F
Sphemeropte							
	Ameletidae						
		Ameletus	1	0.32%	Yes	0	C
	Baetidae						
		Baetis tricaudatus	7	2.27%	Yes	4	С
	Ephemerellidae						
		Drunella coloradensis	3	0.97%	Yes	0	F
		Drunella spinifera	2	0.65%	Yes	0	P
	** . ***	Serratella tibialis	19	6.15%	Yes	2	C
	Heptageniidae	D					
	Laptanblabildes	Epeorus longimanus	17	5.50%	Yes	1	S
	Leptophlebiidae	D					
lecoptera		Paraleptophlebia	3	0.97%	Yes	1	С
recoptera	Chloroperlidae						
	Chloropernuae	Sweltsa					
	Nemouridae	Swellsa	4	1.29%	Yes	0	Ρ
	Nemoth Mae	Malanko					
		Malenka	5	1.62%	Yes	1	S
richontera	Hydroptilidae						
richoptera	any aropanata c	FF 4	5	1 (00)			_
richoptera		Hudrontila			Yes	6	\mathbf{P}
richoptera	Lepidastomatidae	Hydroptila	5	1.62%			
richoptera	Lepidostomatidae	-					_
richoptera		Hydroptila Lepidostoma (turret case)	2	0.65%	Yes	1	s
richoptera	Lepidostomatidae Limnephilidae	Lepidostoma (turret case)	2	0.65%	Yes		S
richoptera	Limnephilidae	-				1 3	
richoptera		<i>Lepidostoma</i> (turret case) Limnephilidae	2 2	0.65% 0.65%	Yes Yes	3	s
richoptera	Limnephilidae	Lepidostoma (turret case)	2	0.65%	Yes		s c c

(Continued.....)

 Site Name
 STONY CREEK 0.25 MI U/S MOUTH 9 MILE CREEK
 STORET STATION

 (...continued from previous page)
 (...continued from previous page)
 (...continued from previous page)

C04STNYC02

	Rhyacophilidae						
		Rhyacophila Betteni Gr.	4	1.29%	Yes	0	PR
		Rhyacophila Brunnea Gr.	5	1.62%	Yes	2	PR
		Rhyacophila narvae	1	0.32%	Yes	0	PR
Triciadida							
	Planariidae						
		Polycelis coronata	56	18.12%	Yes	1	OM
Veneroida							
	Pisidiidae						
		Pisidiidae	5	1.62%	Yes	8	CG
Grand Total			309				

	DEQ03C04		Activity ID:	03-C207-M	6		
	4STNYCO2 ONY CREEK 0 25 MIU/ <u>S</u> MOUT	TE 9 MILE CREEK	Sample Date:	7/23/2003	3		
Semple type	KICK	II 9 MILL CREEK	DOMISANCE	1/23/2000	3		
SUBSAMPLE TOTAL ORGANISM	IS 304						
Portion of sample used	8.33%		TAXON		ABUNDANCE	PERCENT	-
Estimated number in total samp	le 3708		Polycelia coronata			6 18.12%	
Seanphrag effort Time	OURATION 1 1	MINUTES / 15 FEET	Tu-tenia Pagastia		• 3	2 13.59% 8 12.30%	
Distance	DOMATION 1.1.	Sumores / ISPERI	Serratella tibralia			9 6.15%	
Jabs			Epeorus longimenus		1		
Babitat, type			SUBTOTAL 5 DOMINAN	TS	17		
EPT abundance	92		Heterimonus			5 4 85%	
Tam nelmess	39		Cricotopus (Nostococlas)	xx.u0)		1 3 56%	
Number EPT taxa	17		Clepteimis			9 2.91%	
Percent EPT	29.77%		Simulium			8 2.59%	
TAXONOMIC COMPOSITION			Daeta tricmidatus TOTAL DOMINANTS		22	7 2 27%	
GROUP PERCENT	AXAIN		TOTAL DOMENANTS			2 71.84%	-
Non-insect taxa 20.39%	3		SAPROBITY				
Dionata 0.00%	0		Hilsenhoff Biotic Index			2.80)
Ephemeroptera 16.83%	7						
Plecoptera 2.91%	2		OIVERSITY				
Heteroptera 0.00%	0		Shannon H (loge)			4 84	
Megaloptera 0.00%	0		Shannon H (log2)			3 36	
Inchoptera 10.03% Lendontera 0.00%	9		Margalef D			6 97	
lepidopiera 0.00% Soleopiera 9.71%	5		Sampson D Evenness			0.08	
Diptera 3.24%	3		VOLTINISM			0.08	
Chironouadae 36.89%	12		TYPE		# TAXA	PERCENT	
		1	Multivoltine		16	59.55%	
			Univoltine		20	31 07%	
3979020	NA STREET STREET		Semivoltime		3	9 39%	
Land and the state			TAXA CHARACTERS				
	and a second second second	1	T 1	ATAXA		PERCENT	
			Tolerant Sensurve	3		4.85% 6.15%	
0% 20%	40% 60% 8	80% 100%	Clarger	17		39 16%	
Non-insect taxa	Odonata Ephemeru	ptera Decoptera	CHIRE	17		39 10%	
	Megaloptera Trachoptera		BIOASSESSMENT INDE	CES			
	Diptera O Charonomi		H-IBI (Harr of al.)				
			METRIC	VALUE		SCORE	
UNCTIONAL COMPOSITION			Trota richness	39		3	
GROUP PERCENT	ITAXA		E nchness	7		з	
redatur 7.12%	8		P richness	2		1	
Parasure 0.00%			m - 1	-			
	0		T richness Long lond	9		3	
Gatherer 51.78%	18		Long-leved	3		3 3	
Gatherer 51.78% Filterer 0.47%			Long lived Sensitive richness	3 3		3 3 3	
Gatherer \$1.78% Filterer 0.47% Elerbivore 0.00%	18 4		Long-leved Sensitive richness %tolerant	3 3 4 85%		3 3 3 5	
Gatherer 51.78% Filterer 0.47% Berbivore 0.00% Piercer 1.62%	18 4 0		Long-leved Sensitive nchness %toierant %predators	3 3 4 85% 7 12%		3 3 3 5 1	
Gatheres \$1.78% EDiterer 0.47% Herbwore 0.00% Phercer 1.62% Scraper 5.50% Shuredder 9.39%	18 4 0 1 1 8		Long-leved Sensitive richness %tolerant	3 3 4 85%		3 3 5 1 3 5	
Gatherer \$1.78% Fülterer 0.47% Berbwore 0.00% Phercer 1.62% Scraper 5.50% Sluredder 9.35% Dimawore 18.12%	18 4 0 1 1 8 1		Long-leved Sensitive nchness %folerant %predators Clinger richness %dommance (3)	3 4 85% 7 12% 17 44.01%	TOTAL SCORE	3 3 5 1 3 5	60%
Gatherer \$1.78% Fülterer 0.47% Berbwore 0.00% Phercer 1.62% Scraper 5.50% Sluredder 9.35% Dimawore 18.12%	18 4 0 1 1 8		Long-laved Sensitive rachness %tolerant %gredators Clinger richness	3 4 85% 7 12% 17 44.01%	1998)	3 3 3 5 1 3 5 5 30	
Gatherer \$1.78% Fülterer 0.47% Berbwore 0.00% Phercer 1.62% Scraper 5.50% Sluredder 9.35% Dimawore 18.12%	18 4 0 1 1 8 1		Long-leved Sensitive nchness %folerant %predators Clinger richness %dommance (3)	3 4 85% 7 12% 17 44.01%		3 3 5 1 3 5	60% Mountain Ecoregiona
Gatherer \$1.78% Fülter# 0.47% Herbwore 0.07% Phercer 1.62% Scraper 5.50% Sluredder 9.35% Dunnuwsre 18.12%	18 4 0 1 1 8 1		Long-loved Sensitive nchness Violeraut Vigredutors Chinger nchness Violonmance (3) MONTARA DEQ METRI METRIC	3 3 4.85% 7 12% 17 44.01% C6 (Buk antis VALUE	1998) Plaua	3 3 5 1 3 5 5 30 Valleys and Foothills	Mountain Ecoregiona
Batheres 51.78% Ditterer 0.47% Ectoboroe 0.00% Percer 1.62% Krmper 5.50% Bluredder 9.39% Dimawore 18.12%	18 4 0 1 1 8 1	Predator	Long-loved Sensitive nchneass Notoleraut Negredators Clinger richness MOBTARA DEQ METRI METRIC Taxa richness	3 3 4.85% 7 12% 17 44.01% C6 (Buk antia VALUE 39	1998j Plauas Ecoregions 3	3 3 5 1 3 5 30 Valleys and Foothills 3	Mountain Ecoregions 3
Batheres 51.78% Ditterer 0.47% Ectoboroe 0.00% Percer 1.62% Krmper 5.50% Bluredder 9.39% Dimawore 18.12%	18 4 0 1 1 8 1	Predator	Long-loved Sensitive nchness Violeraut Vigredutors Chinger nchness Violonmance (3) MONTARA DEQ METRI METRIC	3 3 4.85% 7 12% 17 44.01% C6 (Bukanth VALUE 39 17	Ecoregions 3 3	3 3 5 1 3 5 30 Vall-ys and Foothills 3	Mountean Ecoregions 3 2
Batheres 51.78% Ditterer 0.47% Ectoboroe 0.00% Percer 1.62% Krmper 5.50% Bluredder 9.39% Dimawore 18.12%	18 4 0 1 1 8 1	■ Predator S Parreste	Long-loved Sensitive rachness Molerant Charger richness Montana deg Metral MONTANA deg Metral METERC Taxa rachness EFT rachness	3 4 85% 7 12% 17 44.01% C8 (Bukantle VALUE 39 17 2 80	1998j Plauas Ecoregions 3	3 3 5 1 3 5 30 Vall-ys and Foothills 3 3 3 3 3 3	Mountean Ecoregions 3 2 3
Gatherer \$1.78% Fülterer 0.47% Berbwore 0.00% Phercer 1.62% Scraper 5.50% Sluredder 9.35% Dimawore 18.12%	18 4 0 1 1 8 1		Long-loved Sensitive nchness Violeraut Vigredutors Clinger richness Violonmance (3) MOSTARA DEQ METRI METRIC Taxa nchuess EPT nchness Biote Index Violomnant taxan Violomnant taxan	3 3 4.85% 7 12% 17 44.01% C6 (Bukanth VALUE 39 17	a 1998) Plauns Ecoregions 3 3 3 3	3 3 5 1 3 5 30 Vall-ys and Foothills 3	Mountean Ecoregions 3 2
Gatherer \$1.78% Fülterer 0.47% Berbwore 0.00% Phercer 1.62% Scraper 5.50% Sluredder 9.35% Dimawore 18.12%	18 4 0 1 1 8 1	10 Paresite	Long-loved Sensitive rechness Violerant Vigredators Chinger richness Violommance (3) MOSTARA DEQ METRI METRIC Taxa netwess E PT netwess Biote Index Violommant teaon ViCallectors Vicalectors	3 3 4 85% 7 12% 17 44.01% C6 (Bukanth VALUE 39 17 2 80 18 12% 58 25% 29 77%	 1998) Please Ecoregions 3 3 3 3 3 3 3 3 3 	3 3 5 1 3 5 5 5 7 30 Vallerys and Foothills 3 3 5 3 3 3	Mountean Ecoregions 3 2 3 3 3
Gatherer \$1.78% Fülterer 0.47% Berbwore 0.00% Phercer 1.62% Scraper 5.50% Sluredder 9.35% Dimawore 18.12%	18 4 0 1 1 8 1		Long-loved Sensitive nchness %doleraut %dpredutors Chinger nchness %dommance [3] MONTARA DEQ METRI METRIC Taxa nchmess EFF nchness Biotic Index %dOminant taxon %dOminant taxon %dOminant taxon %dOminant taxon %dOminant taxon	3 3 4 85% 7 12% 17 44.01% C6 (Bukantis VALUE 39 17 2 80 18 12% 58 25% 29 77% 3.36	 1998) Planas Ecoregions 3 3 3 3 1 3 	3 3 5 1 3 5 5 5 5 7 30 7 7 8 7 8 7 8 7 8 7 8 3 3 3 0	Mountain Ecoregiona 2 3 3 3 3 0
Batheres 51.78% Ditterer 0.47% Ectoboroe 0.00% Percer 1.62% Krmper 5.50% Bluredder 9.39% Dimawore 18.12%	18 4 0 1 1 8 1	15 Paresite 11 Gatherer	Long-loved Sensitive rechness Violerant Vigredators Chinger richness Violonimance (3) MOBTARA DEQ METRI METRIC Toos nechness E PT nechness Biote Index Violonimant teaon Violalectors Vieler Sharmon Diversity Vistropers Abredders	3 3 4 85% 7 12% 17 44.01% C6 (Bukanth VALUE 39 17 2 80 18 12% 58 25% 29 77% 3.36 14.89%	1998) Planas Ecoregions 3 3 3 3 3 3 1 3 1 1 1	3 3 5 1 3 5 - 30 Valleys and Foothills 3 3 - 3 3 3 3 3	Mountean Ecoregions 3 3 3 3 3 3
Batheres 51.78% Ditterer 0.47% Ectoboroe 0.00% Percer 1.62% Krmper 5.50% Bluredder 9.39% Dimawore 18.12%	18 4 0 1 1 8 1	10 Paresite	Long-loved Sensitive rachness Vstoleraut Vstoleraut Vstoleraut Vstoleraut MONTARA DEQ METRI METRIC Taxa rachness EFT nchoess Biote Index VSDomnant taxon VsCollectors VsEPT Sharmon Diversity VsCrapers 4Shreidarts Predator taxa	3 4.85% 7.12% 17 44.01% C6 (Bukaatle VALUE 39 17 2.80 18.12% 58.25% 29.77% 3.36 14.89% 8	 1998) Planns Ecoregions 3 3 3 3 1 3 1 3 	3 3 5 1 3 5 5 5 5 7 30 7 7 8 7 8 7 8 7 8 7 8 3 3 3 0	Mountain Ecoregiona 2 3 3 3 3 0
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Jathere 51. 78% Dittere 0.47% Jerbove 0.00% Jerrer 1.62% Kringer 5.50% Jinknown 0.00% Jinknown 0.00% Dinknown 0.00% Di	18 4 0 1 1 8 1 0 0 0 0 0 0 0 0 0 0 0 0 0	55 Parreste 66 Gatherer 16 FJterer 16 Herbaure 16 Piercer 10 Scraper 10 Stuedder 10 Stuedder 10 Otonavore	Long-loved Sensitive rechness Veloremut Veloremut Merredators Chinger richness Velorimmer (3) MONTARA DEQ METRI METRIC Taxa nachness EFT netwess Biote Index Velorimmer teason Velorimmer teason	3 3 4 85% 7 12% 17 44.01% C6 (Bukantin VALTE 39 17 17 17 17 29 17 17 29 17 17 29 17 17 17 17 17 17 17 17 17 17	1998) Planne Ecoregions 3 3 3 1 3 1 3 1 3 7 25 83.33 NON	3 3 3 3 5 1 3 3 4 Valleys and Foothls 3 3 3 3 3 3 3 3 3 3 0 1 19 79.17 79.17 79.17 79.17 79.17 79.17 70.10RH 	Mourarean Ecoregoons 3 3 3 0 0 0 14 6667 SLIGET Flaina Ecorega Valleys and Fo Mountain Ecor
Gatherer \$1.78% Fülter# 0.47% Berbnore 0.07% Herbnore 0.07% Scraper 5.50% Shredder 9.35% Ontauwre 18.12%	18 4 0 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0	55 Parreste 66 Gatherer 16 FJterer 16 Herbaure 16 Piercer 10 Scraper 10 Stuedder 10 Stuedder 10 Otonavore	Long-loved Sensitive rechness Violerant Vigredators Charger richness Violerant METISC Taxa pachaess EIT notherss EIT notherss Biotoc Indes Violomanat taxan Violatedars Violat	3 3 4 85% 7 12% 17 44.01% C6 (Bukantin VALTE 39 17 17 17 17 29 17 17 29 17 17 29 17 17 17 17 17 17 17 17 17 17	1998) Planns Ecoregions 3 3 3 3 3 3 1 3 3 2 25 83 33 NON ntsus DEQ mets (Branblett and 1 2 25 3 1 1 3 2 2 5 3 1 3 7 1 1 3 2 2 5 3 3 NON (1 1 3 2 (7 7 7 0 0 7 7 5 4 695 5 4 695 5 4 695 5 4 695 5 4 695 5 4 695	3 3 3 3 5 3 4 5 3 5 3 4 5 5 3 3 3 3 3 3 3 3 3 3 3 3 3	Mourarean Ecoregions 3 3 3 0 0 14 66 67 5LIGRT Plaina Ecoregis Valleys and Fo Mountain Ecor

Montana Plains acoregions metrics [B	namblett and Johnson)	
Riffle	Pool	
EPT nchmeas	17 E richness	7
Percent EPT	29 77% T richness	g
Percent Objochaetes and Leeches	0.00% Percent EPT	29 77%
Percent 2 dommants	31.7.2% Percent non-maect	20.39%
Filterer richness	4 Filterer richness	4
Percent intolerarit	54.69% Univoltine richness	20
Univoltane richness	20 Percent supertolerant	3.56%
Percent chagers	39.16%	
Swimmer richness	3	

